UNITED STATES OF AMERICA:
WAR DEPARTMENT.

MONTHLY WEATHER REVIEW.

(GENERAL WEATHER SERVICE OF THE UNITED STATES.)

SEPTEMBER, 1889.

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PREPARED UNDER THE DIRECTION OF
BRIGADIER GENERAL A. W. GREELY,
CHIEF SIGNAL OFFICER OF THE ARMY,

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1889.

List of merchant marine steam and sailing vessels from which International Meteorological reports were received at the office of the Chief Signal Officer, U. S. Army, Washington, D. C., in time to be used in the preparation of the Weather Review for the month of September, 1889.

Name of vessel.	Captain.
Am. s. s. Adirondack	J. Sansom.
Br. Adriatic	J. G. Cameron.
Ailsa	J. W. Morris.
Alameda	H. G. Morse.
Alaska	G. S. Murray.
Alene	E. J. Seiders.
Am. Algiers	F. W. Mason.
Ger. Aller	H. Christoffers.
Br. Alvena	F. McKay.
Alvo	David Williams.
Ger. America	A. Kohlmann.
Dtch. Amsterdam	G. Stenger.
Br. Anchoria	A. Campbell.
Angers	James Pinkham.
Ardangorm	H. Cameron.
Arizona	S. Brooks.
Athos	H. Low.
Ger. Augusta Victoria	A. Albers.
Br. Aurania	H. McKay.
Australis	J. McKeague.
Author	R. Owen.
Baltimore	J. W. Simpson.
Barracouta	R. R. Hubbard.
Barrowmore	W. H. Moore.
Bavarian	M. Fitt.
Bayonne	J. E. Payne.
Belg. Belgenland	R. Weyer.
Br. Bengore Head	D. Smith.
Span. Benito Estenger	E. F. Canal.
Benita	L. Santaulari.
Nor. Bergensen	J. Martinsen.
Br. Bessarabia	J. Martin.
Bessel	Chas. Allcot.
Ger. Bohemia	H. Leithauser.
Br. Borderer	F. Manley.
Bothnia	J. B. Watt.
Ger. Brannschweig	A. Meier.
Br. Britannic	H. Davison.
British King	John Kelly.
British Prince	S. Nowell.
British Princess	E. H. Freeth.
Brooklyn City	W. Fitt.
Ger. Buenos Ayrean	James Scott.
Br. Buffalo	J. R. Malet.
Br. Californian	J. W. Pickhall.
Camellia	E. Penney.
Carroll	G. H. Brown.
Catalonia	J. J. Atkin.
Ger. Catania	H. M. Franck.
Br. Cephalonia	Thomas Dutton.
Am. Chalmette	Geo. Mason.
Fr. Chateau Lafite	M. C. Olliver.
Am. Charles Morand	W. H. Marshall.
Cherokee	H. A. Bearse.
Br. Circassia	J. Harris.
Am. City of Alexandria	J. McIntosh.
City of Augusta	J. W. Catherine.
Br. City of Berlin	Francis S. Land.
City of Chicago	A. Redford.
City of New York	A. W. Lewis.
City of Newcastle	R. Townsend.
Am. City of Para	J. L. Lockwood.
Br. City of Rome	H. Young.
Claribel	Thos. McKnight.
Colina	R. C. Jennings.
Am. Colorado	F. E. Jenkins.
Ger. Columbia	C. Hebich.
Br. Counsellor	W. Lang.
Crystal	R. B. Stannard.
Damara	Geo. Dixon
Denmark	R. S. Rigby.
Derwent	James Pope.
Devonia	Jno. Craig.
Fr. Dupuy de Lome	S. Dechaille.
Br. Earnwell	W. H. Carter.
Dtch. Edam	W. Bakker.
Br. Edith Godden	J. H. Bennett.
Am. Edith Hough	f. Foley.
Br. Egypt	J. Sumner.
Elgiva	H. Bermpohl.
Ger. Elder	H. Baur.
Elbe	R. Sander.
Am. El Monte	R. B. Quick.
El Paso	H. S. Quick.
Ger. Ems	T. Jungst.
Br. England	A. F. Heeley.
Span. Enrique	R. de Aberaturi.
It. Entella	V. Bruno.
Br. Erin	W. Tyson.
Ethiopia	John Wilson.
Etruria	W. H. P. Hains.
Span. Euskaro	S. de Fellerio.
Am. Excelsior	H. L. Higgins.
Br. Federation	R. Pinkham.
Ferrando	M. Hetherington.
Floridian	S. S. Sandrey.
France	A. D. Hadley.
Ger. Fulda	R. Ringk.
Br. Gaelic	W. G. Pearne.
Gallia	M. Murphy.
Ger. Gellert	C. Kaempff.
Br. Germanic	H. Davison.
Glenfield	J. Newdick.
Ger. Glucksauf	V. Szymanski.
Br. Grecian	C. E. De Gallais.
Greece	A. J. Jeffrey.
Span. Guido	E. Lachiondo.
Ger. Hammonia	Kuhlewein.
Haytian Republic	G. W. Brown.
Hermann	W. Schmolder.
Br. Hibernian	John Brown.
Hindoo	Jas. Douglas.
Holbein	James Glaspole.
Holland	Thos. Foote.
Horrox	T. Hening.
Ger. Hungaria	Droescher.
Br. India	B. Jamieson.

Name of vessel.	Captain.
Br. s. s. Iowa	E. W. Owens.
Dan. Island	P. Larsen.
Br. Istrian	A. W. Ball.
Ger. Italia	G. Schmidt.
Br. Italy	W. Pearce.
Ixia	Wm. Churnside.
Jamiaean	D. Edwards.
James Turpie	W. Smith.
Kansas	A. Fenton.
Kathleen	R. Mackay.
Kepler	M. Fleet.
Nor. Kong Alp	J. Dahl.
Fr. La Bourgogne	E. Franguel.
La Bretagne	M. de Jousselin.
La Champagne	Boyer.
Br. La Flandre	E. Smit.
Fr. La Gascogne	Santelli.
Ger. Lahn	H. Hellmers.
Br. Lake Huron	P. D. Murray.
Lake Nepigon	C. F. Herriman.
Lake Ontario	H. Campbell.
Lake Superior	Wm. Stewart.
Lake Winnipeg	F. Carey.
Am. Lampassas	M. B. Crowell.
Fr. La Normandie	G. Collier.
Br. Lero	J. Chisholm.
Llandaff City	T. H. Gore.
Lord Clive	P. Urquhart.
Lord Gough	E. M. Hughes.
Lord O'Neill	A. Ferris.
Am. Louisiana	E. V. Gager.
Br. Lydian Monarch	T. C. Huggett.
Ger. Main	M. Moller.
Br. Maine	R. Griffith.
Manitoban	J. M. Johnstone.
Marenhense	Thos. Pole.
Ger. Marsala	N. Mass.
Span. Mendes Nunes	J. Sopes.
Br. Maryland	A. H. Luckhurst.
Mascotte	Jas. Ross.
Matthew Bedlington	R. Stainthorp.
Mentmore	R. Waite.
Michigan	S. Walters.
Minneola	T. L. Evans.
Minia	S. Trott.
Minnesota	R. J. Blacklin.
Missouri	H. Bocquet.
Ger. Munchen	A. Jæger.
Am. Mount Edgcombe	J. Wetherell.
Span. Navarro	S. de Aldecocea.
Belg. Nederland	E. Bence.
Br. Nessmore	G. Elliott.
Nestorian	J. France.
Fr. Neustria	P. Verries.
Nevada	J. A. Stewart.
Am. Newport	C. C. Lima.
New Orleans	T. P. C. Halsey.
Noordland	H. E. Nickels.
Nor. Norrona	J. J. Isakjen.
Br. Norseman	R. Williams.
Northgate	W. Ramsdale.
Nova Scotian	R. H. Hughes.
Am. Nueces	Sam Risk.
Ger. Nurnberg	H. Engelbart.
Dtch. Obdam	G. Bakker.
Am. Ohio	P. L. Moore.
Br. Ontario	W. P. Couch.
Oranmore	B. Jones.
Oregon	H. C. Williams.
Orinoco	J. S. Garvin.
Osmanli	C. O'Hagan.
Othello	H. Mundy.
Palestine	W. Whiteway.
Para	James Brander.
Pavonia	A. McKay.
Dtch. P. Caland	G. Luts.
Belg. Pennland	C. H. Grant.
Am. Pennsylvania	E. B. Thomas.
Br. Peruvian	J. M. Wallace.
Picqua	J. T. Lund.
Ger. Polaris	F. Schroder.
Am. Portia	F. Ash.
Dtch. Prinz Hendrik	H. N. Prins.
Br. Professor	G. H. Keller.
Prussian	J. Ambury.
Red Sea	C. Bakar.
Ger. Rhaetia	E. Kopff.
Rhein	W. Kuhlmann.
Belg. Rhyland	A. Mills.
Br. Ripon City	J. Brotchie.
Rochampton	R. Sanderson.
Roman	E. Maddox.
Rossmore	J. Inch.
Dtch. Rotterdam	H. C. v. d. Zee.
Ger. Rugia	R. Karlowa.
Saale	H. Richter.
Br. Sacrobosco	H. Gibb.
St. Asaph	C. H. Hossock.
Br. Saint Ronans	H. Campbell.
Salerno	B. H. Rogers.
Samaria	T. Hewitson.
Santiago	J. B. Allen.
Sardinian	W. Richardson.
Sarnia	J. Gibson.
Scandinavian	J. Park.
Scythia	T. Roberts.
Am. Seneca	F. Stevens.
Span. Serra	F. de Luzaraga.
Br. Servia	H. Walker.
Siberian	R. P. Moore.
Sicilia	W. R. Prideaux.
Nor. Sif	H. Bentson.
Ger. Slavonia	H. Schmidt.
Br. Sirius	T. P. Fisher.
Spain	W. A. Griffiths.
State of Georgia	G. Moodie.
State of Indiana	A. Ritchie.

Name of vessel.	Captain.
Br. s. s. State of Nebraska	A. G. Braes.
State of Nevada	J. A. Stewart.
State of Pennsylvania	A. J. A. Mann.
State of Texas	G. Williams.
Strabo	A. Matheson.
Strathairly	D. Boughton.
Ger. Suevia	C. Ludwig.
Br. Sues	D. Cockery.
Belg. Switzerland	J. Ueberweg.
Br. Teutonic	H. Parsell.
The Queen	T. P. Heeley.
Dan. Thingvalla	S. T. H. Laub.
Br. Toronto	J. MacAuley.
Tower Hill	R. P. Bennett.
Nor. Tordenskjold	C. Urchermann.
Ger. Trave	W. Willigerod.
Br. Ulunda	T. Clark.
Umbria	W. McMickan.
Vancouver	C. J. Lindall.
Vandyck	T. Phelan.
Dtch. Veendam	A. J. Potjer.
Br. Venetian	E. Parry.
Venice	A. B. Bolt.
Viola	L. Murray.
Virginian	W. C. Fry.
Waldensian	A. Whyite.
Waverly	R. Calvert.
Ger. Werra	R. Bussius.
Belg. Westernland	J. C. Jamison.
Br. Wetherly	J. W. Harrison.
Wildflower	F. H. Whitson.
Ger. Wieland	H. Barends.
Br. William Cliff	E. Winder.
Wisconsin	J. P. Worral.
Wylo	T. Rogers.
Wyoming	C. L. Rigby.
United States Naval.	
U. S. C. S. A. D. Bache	J. F. Moser.
U. S. F. C. Albatross	Z. L. Tanner.
U. S. C. S. G. S. Blake	J. F. Pillsbury.
U. S. S. Boston	J. O'Kane.
U. S. S. Chicago	H. B. Robeson.
U. S. S. Despatch	W. S. Cowles.
U. S. S. Dolphin	G. F. F. Wilde.
U. S. C. & G. S. schr. Earnest	J. N. Jordan.
U. S. S. Enterprise	B. H. McCalla.
U. S. C. S. Gedney	J. M. Helm.
U. S. S. Jamestown	B. T. Lamberton.
U. S. S. Minnesota	G. C. Wiltse.
U. S. S. New Hampshire	J. F. Higginson.
U. S. S. Ranger	F. A. Cook.
Sailing vessels.	
Br. bk. Ada Peard	N. Hocken.
Am. schr. Addie Jordan	W. H. Harriman.
Ger. sp. Anna	J. Menkins.
Am. bg. Arcot	J. W. Cates.
Br. bkt. Brazil	H. Davison.
Ger. bk. Canada	R. Hermann.
China	T. Selberg.
Br. bk. Christina Redman	E. A. Watts.
Am. schr. City of Baltimore	L. S. Tawes.
Ger. sp. Cleopatra	A. Von Seggern.
Br. bgt. Diadem	J. Crasso.
Am. sp. E. B. Sutton	C. O. Carter.
schr. Era	J. O. Spicer.
Br. bk. Eudora	H. J. Lewis.
sp. Euphemia	H. H. Cann.
Am. schr. Florence Randall	J. L. Randall.
Aust. bk. Francesca T	M. P. Martinolich.
Am. schr. Gertrude	R. H. Cox.
sp. Glendon	E. Thacher.
Ger. bk. G. N. Wilcox	W. Rasche.
Goshen	D. Knippenberg.
Am. bkt. Harriet S. Jackson	W. Bacon.
schr. Henry A. Faber	H. E. Garlick.
Nor. sp. Herl of Herlofsen	J. B. Kroger.
Ger. bk. Hermon	O. Olsen.
Nor. sp. Hugin	Joh. Ev. d. Ohl.
bk. Inga	H. Gronn.
Br. bk. Iodine	Adam Smith.
Am. sp. Jacob E. Ridgway	Jarvis Call.
bk. Jane Adeline	G. W. Cates.
Br. bk. Jennie Parker	G. E. Barker.
Am. schr. Jennie S	Chas. Sinclair.
bk. John D. Brewer	W. J. Josselyn.
schr. John R. Bergen	W. H. Squires.
bkt. Jose E. More	Asmus Leonhard.
pilot Joseph F. Loubat	J. McCarthy.
schr. Kate Church	J. H. Weeks.
It. bk. Lazzaro Bianchi	N. Dollorso.
Br. bk. Lillie Soullard	A. D. Hilton.
Am. sp. Light vessel No. 45	Andrew Jackson.
Br. sp. L. J. Morse	W. T. Savoy.
Loch Eck	I. K. Pittendrigh.
Am. bk. Mary Hasbrouck	W. Ludwigs.
schr. Maud H. Dudley	D. W. Oliver.
Am. bkt. Monsita	F. M. Wallace.
Ger. bk. Pillau	G. Gerlach.
Nor. bk. Prince Eugene	C. Nygaard.
Regia	T. Duits.
Aust. bk. Ribes	N. M. Sutton.
Am. bg. Robert Mowe	W. Peterson.
Br. bk. Salina	J. Peterson.
Sapphire	G. W. Murray.
Am. bk. Sarah	L. B. Hale.
Fr. bg. Sepet	J. B. Hourdel.
Am. bg. Shannon	R. Cosgrove.
Br. bk. Sodium	W. Manson.
Ger. bk. Soli-Deo-Gloria	F. Abendroth.
Am. bk. Thomas A. Goddard	A. C. Sears.
schr. Thomas P. Ball	H. B. Ryder.
T. W. Dunn	R. McFarland.
Ger. sp. Union	H. Fokken.
Am. yacht Viking	J. M. Loomis.
Am. schr. Wm. Wilson	C. S. Powell.

UNITED STATES SIGNAL SERVICE

MONTHLY WEATHER REVIEW.

VOL. XVII. WASHINGTON CITY, SEPTEMBER, 1889. No. 9.

INTRODUCTION.

This REVIEW is based on reports for September, 1889, from 2,297 regular and voluntary observers in the United States and Canada. These reports are classified as follows: 178 reports from Signal Service stations; 120 monthly registers from United States Army post surgeons; 1,460 monthly registers from state weather service and voluntary observers; 24 reports from Canadian stations; 168 reports through the Central Pacific Railway Company; 347 marine reports through the co-operation of the Hydrographic Office, Navy Department; marine reports through the "New York Herald Weather Service;" monthly weather reports from the local weather services of Alabama, Arkansas, Colorado, Dakota, Illinois, Indiana, Iowa, the Iowa Weather Crop Bulletin Service, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Meteorological Report of the Missouri State Board of Agriculture, Nebraska, Nevada, New England, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Texas, and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

CHARACTERISTICS OF THE WEATHER FOR SEPTEMBER, 1889.

For a limited portion of the Atlantic coast the most prominent meteorological feature of the month was the storm which advanced from the Windward Islands, West Indies, to the middle Atlantic coast from the 3d to the 12th, inclusive. The course of this storm, together with the high tides attending it, caused a considerable amount of damage along the New Jersey and the western part of the Long Island coasts. The proximity of this storm to the great commercial centres of the country, together with the prostration of telegraph lines and interruption of railway travel, gave rise to the belief and statement that this storm was one of the great hurricanes of the century. The collated observations, however, whether considered with reference to the low point reached by the barometer, to the steepness of the barometric gradient, to the violence of attending winds or their sudden and changing direction, or whether from the more important points of damage to maritime interests by delays of vessels or other losses, or finally with reference to the loss of human life, this storm presents in all these characteristics conditions less marked and fatal than have frequently occurred in connection with other West India storms. The data on this point will be found with the detailed description of the storm. The passage of this cyclone was forecast by this office in a manner so successful as to indicate not only the value of this service, but the degree of accuracy which can often be attained in the display of cautionary and storm signals. The storm failed at Wood's Holl, Massachusetts, to even reach a half gale, while at Cape Hatteras the wind velocity was barely half that which has been before reached and the gale was by no means severe. During this time the Signal Service warnings specifically indicated dangerous winds between Nantucket and Cape Hatteras, and ship owners were informed that vessels could sail to the northward from Nantucket, but not to the southward, and on the North Carolina coast could sail to the southward, but not to the northward.

Acknowledgments of the material value from warnings of this office appear in the description of the storm. This storm was not particularly destructive over the West Indies, and the track of the centre of this disturbance can only be approximately located from the 4th to the 8th, owing to the absence of reports over an area ranging from four to six hundred miles in diameter covering the region of lowest pressure. After passing to the north of the thirtieth parallel it doubtless increased in energy, and was apparently forced to the westward by an area of high pressure to the northward, and this abnormal movement of the storm-centre was attended by gales of hurricane force, which caused considerable loss to shipping, and unusually high and destructive tides from New England to the Carolinas. Severe storms also prevailed over mid-ocean during the presence of this storm off the American coast. An important West Indian hurricane moved westward over the Caribbean Sea from the 13th to 17th, inclusive, and thence apparently passed over Yucatan and recurved to the north-central coast of the Gulf of Mexico by the 22d. Attending the passage of this hurricane, a storm, commencing during the afternoon of the 18th, devastated the coast of Campeche. On the morning of the 19th a storm which had suddenly developed great energy was central off the coast of Maine, whence it moved northward with a rapid decrease in energy. Severe local storms were most frequently reported in Texas and Indian Territory, where they were noted for five dates. The Arctic ice reported near Newfoundland corresponded in distribution with, but in quantity was somewhat in excess of, the average for the month.

The month was generally cooler than the average September, except in the Saint Lawrence Valley, the Canadian Maritime Provinces, northeastern New York, the north-central and northeastern parts of the upper lake region, at Jacksonville, Fla., over the southern plateau region, and on the Pacific coast south of the Columbia River. The greatest departures below the average temperature occurred in north-central Texas and Indian Territory, where they were more than five degrees. The departures above the average temperature were less than four degrees. The highest mean temperature reported for the month was 91°.3, at Cactus, Cal., and the lowest was 31°.7, at Pike's Peak, Colo. At New Ulm, Tex., seventeen years record, the mean temperature, 74.6, was one degree below the lowest September mean previously reported, noted in 1876. The highest absolute temperature reported was 116°, at Mojave, Cal., and the lowest minimum temperature, exclusive of Pike's Peak, Colo., where 2° was registered, was

5°, at Dolly Varden Mines, Colo., and 8° at Alma and Breckenridge, Colo. At one or more stations in Minnesota, Colorado, Arizona, Washington Territory, Louisiana, and Maine, respectively, the maximum temperature was as high or higher than previously noted for September, while at one or more stations in Florida, Texas, Illinois, Iowa, Kansas, Montana, Indian Territory, Arizona, Utah, Idaho, Oregon, and Washington Territory, respectively, the minimum temperature fell as low or lower than reported for September of preceding years. Damaging frost was reported in Nebraska on the 2d; in Minnesota on the 6th, in Wisconsin on the 16th, in Iowa on the 17th, in Iowa, Michigan, and Wisconsin on the 18th; in Iowa and Wisconsin on the 19th, in Michigan and Ohio on the 22d, in New York on the 23d, in Kansas on the 24th, in Michigan, Nebraska, and Iowa on the 27th; and light frost was reported as far south as the Carolinas, northern Georgia, northern Alabama, central Texas, southern New Mexico, east-central Arizona, central Nevada, and northern California. Killing frost was seasonable in the districts where it occurred.

The heaviest rainfall reported for September, 1889, was 16.71 inches, at Lehigh, Ind. Ter., and the rainfall exceeded ten inches in southern Florida, north-central and eastern Texas, southeastern Kansas, central Kentucky, central New Jersey, southeastern Pennsylvania, and central Virginia. In western Arizona, a greater part of California, in west-central Kansas, east-central Minnesota, western Nebraska, western Nevada, south-central Oregon, and northwestern Utah, no rain fell. The rainfall was generally below the average for the month in the Rocky Mountain and plateau regions, and on the Pacific coast, while to the eastward of the Rocky Mountains the rainfall was very unevenly distributed, large excesses and marked deficiencies occurring in adjoining states and districts. The greatest deficiencies occurred on the south Atlantic coast, in west-central Mississippi and thence southwest to the Gulf coast, where they were more than three inches. In the middle Saint Lawrence valley the rainfall exceeded the average by more than five inches, while in extreme southeastern New York, southeastern Tennessee, and in the upper valley of the Red River of the North the excess was more than four inches. In the south Atlantic states, the Lake regions, the upper Mississippi valley, the northeastern slope of the Rocky Mountains, and in the plateau regions there was a deficiency of rainfall for the current and the preceding month. Snow fell in September, 1889, as far south as extreme northern Texas, where three inches were reported at Folsom on the 23d.

Navigation on the Mississippi River above Dubuque, Iowa, was reported practically closed during the latter part of the month on account of low water. Noteworthy auroral displays were noted at Mount Washington, N. H., 8th; Saint Vincent, Minn., 18–19th, and Eastport, Me., 22d. Damaging drought was reported in parts of eastern Maine, Alabama, Ohio, Michigan, Dakota, and Nevada. Extensive forest fires occurred in Dakota, Michigan, Maine, Colorado, Montana, Oregon, and northern California, and large prairie fires in Minnesota and Dakota. Brilliant meteoric displays were observed at Greensborough, Ala., and Lexington, Ky., on the 24th, at Chattanooga, Tenn., on the 25th, and at Las Vegas, N. Mex., on the 29th.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for September, 1889, as determined from observations taken daily at 8 a. m. and 8. p m. (75th meridian time), is shown on chart ii by isobars. The difference between the mean pressure for September, obtained from observations taken twice daily at the hours named, and that determined from hourly observations varied at the stations named below as follows: At Washington, D. C., New York, N. Y., Boston, Mass., and Chicago, Ill., the mean of the 8 a. m. and 8. p. m. observations was higher by .007, .005, .007, .004, respectively, than the true mean pressure, while at Saint Louis, Mo., the mean of the observations taken at these hours was the same as that determined from hourly observations.

The mean pressure for September, 1889, was highest from Missouri and Arkansas eastward to the Atlantic coast, at stations on the New England and Nova Scotia coasts, and from the north Pacific coast east and southeast over the valleys of the Columbia and Snake rivers, where it rose above 30.05. From the Saint Lawrence Valley, the lower lakes, and the southern portion of the upper lakes southward to the Gulf of Mexico, over a greater part of the middle and northern plateau regions and the middle eastern slope of the Rocky Mountains, and on the Pacific coast north of the fortieth parallel the mean values were above 30.00. The mean pressure was lowest in the lower Colorado valley where it fell to 29.82 at Yuma, Ariz., and in the British Possessions north of Dakota and Montana, where a reading of 29.85 was reported at Qu'Appelle, N. W. T. The mean pressure fell below 29.90 along the northern boundary of the United States between the eighty-fifth and one hundred and tenth meridians, and from the lower Colorado valley northwestward over California to the lower Sacramento valley.

Compared with the pressure chart for August, 1889, a decrease in pressure is shown east of the one-hundredth meridian, save on the Atlantic coast from Massachusetts northward, while over the Rocky Mountain and plateau regions there was an increase in mean pressure. The greatest decrease in pressure occurred over the eastern part of Lake Superior, where it amounted to .10, and the greatest increase over the middle and northern plateau regions, where the mean values were .15 to .19 higher than for the preceding month. In August the mean pressure was highest from the Ohio Valley eastward and southeastward to the Atlantic coast, where it rose above 30.10, while for the current month the highest values were noted in the east-central and extreme northwestern parts of the country, where they were above 30.05. The area of low pressure central in August over the Colorado valley contracted in area, and an increase in mean pressure of about .05 occurred in that region. There was also a slight increase in mean pressure in the British Possessions north of Montana and Dakota.

Compared with the normal pressure for September the mean pressure was generally below the normal east of the plateau regions, except in areas in New England, the Canadian Maritime Provinces, Florida, Missouri, and Arkansas, where the readings corresponded with or slightly exceeded the normal values. Over the plateau regions and along the Pacific coast the mean pressure was above the normal. The greatest departures below the normal pressure occurred at stations along the Atlantic coast between the thirty-sixth and fortieth parallels, and from northern Dakota eastward over Lake Superior, where they exceeded .05, and the most marked departures above the normal were reported in the middle and northern plateau regions, and on the Pacific coast north of the Columbia River, where they were more than .05.

BAROMETRIC RANGES.

The monthly barometric ranges at the several Signal Service stations are shown in the table of miscellaneous meteorological data. The general rule, to which the monthly barometric ranges over the United States are found to conform, is that they increase with the latitude and decrease slightly, though somewhat irregularly, with increasing longitude. In September, 1889, the monthly ranges were greatest in northern New England, where they exceeded 1.00, whence they decreased southwestward to less than .40 over southern Florida and to less than .50 on the west Gulf coast, and decreased westward to the Pacific coast where they varied from less than .40 on the

southern California coast to more than .70 north of the Columbia River. Along the Atlantic coast the extreme ranges varied from .32 at Key West, Fla., to 1.05 at Eastport, Me., and 1.10 at Mount Washington, N. H.; between the eighty-second and ninety-second meridians, .42 at Cedar Keys, Fla., to .92 at Alpena, Mich.; between the Mississippi River and the Rocky Mountains, .48 at Brownsville and Corpus Christi, Tex., to .98 at Saint Vincent, Minn.; in the plateau and Rocky Mountain regions, .32 at Fort Grant, Ariz., to .75 at Boisé City, Idaho; on the Pacific coast, .39 at San Diego, Cal., to .78 at Port Angeles, Wash.

AREAS OF HIGH PRESSURE.

Seven areas of high pressure were observed within the limits of stations of observation during the month of September, 1889. Five of these areas first appeared on the north Pacific coast; one approached stations from the centre of the continent; and one was first observed in the region southeast of Hudson Bay, where the two secondary areas of high pressure, which re-enforced that described as number ii, were also first observed. The average rate of movement was about twenty-three miles per hour, while the maximum rate was thirty-four miles, and the minimum nine miles per hour. The progressive movement was more rapid over the continent, while it was apparently retarded both over the Atlantic and Pacific coasts. Over the western half of the continent the direction of movement was generally to the southeast, while there was a tendency to change direction to east or northeast as they approached or moved eastward of the Atlantic coast line.

Of the high areas which were first observed on the Pacific coast, two were traced across the continent, and three disappeared by gradual decrease of pressure after reaching the centre of the continent. The average duration was four days and the maximum six and one-half days, and the average maximum pressure observed was 30.40 inches.

The following tables exhibit some of the more prominent characteristics of the high areas:

TABLE I.

No.	First observed.			Last observed.		Duration.	Velocity per h'r.	Highest pressure.		
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.			Date.	Station.	Reading.
		°	°	°	°	*Days.*	*Miles.*			*Inches.*
I.....	1	47	74	38	68	3.0	11.0	1	Rockliffe, Ont.....	30.44
II.....	3	48	129	44	61	5.5	30.0	7	Quebec, Quebec	30.26
IIa.....	8	50	76	44	57	2.5	25.0	10	Sydney, C. B. I..... ..	30.36
IIb.....	11	51	72	43	57	4.0	9.0	14	Halifax, N. S.....	30.48
III.....	10	43	127	53	94	2.5	30.0	12	Qu'Appelle, N. W. T	30.46
IV.....	12	44	128	48	83	4.0	34.0	14	Ft. Assinniboine, Mont.	30.32
								15	North Platte, Nebr	
V.....	15	47	125	40	93	3.5	30.0	18	Omaha, Nebr	30.42
VI.....	20	54	99	45	55	6.0	17.0	26	Sydney, C. B. I.....	30.26
								25	Halifax, N. S.....	
VII.....	23	47	124	35	72	6.5	20.0	24	Olympia, Wash	30.50
								27	Leavenworth, Kans	30.51
Mean.	....	48	106	43	71	4.2	22.9	....	.....	30.40

TABLE II.

Number.	Maximum abnormal rise in pressure in twelve hours.			Maximum abnormal fall in temperature in twelve hours.			Maximum wind velocity.		
	Amount.	Station.	Date.	Amount.	Station.	Date.	Miles per hour.	Direction.	Date.
	Inch.			°					
I.....	.16	New York, N. Y	1	12	Chatham, N. B.....	3	18	w.	2
II.....	.54	North Platte, Nebr...	4	27	Fort Custer, Mont.	3	48	n., nw	4
					Saint Paul, Minn...	4			
IIa ..	.14	Quebec, Quebec ..	9	8	Sydney, C. B. I.....	9	48	ne.	9
		Father Point, Que							
IIb...	.14	Rockliffe, Ont	11	8	Halifax, N. S.....	12	60	ne.	11
III....	.62	Bismarck, Dak...	11	24	Fort Sully, Dak.....	11	42	nw.	10
		Fort Sully, Dak ..							
IV....	.38	Des Moines, Iowa....	15	25	Denver, Colo.....	14	34	n.	15
V.....	.30	Bismarck, Dak.....	16	14	Moorhead, Minn	16	36	w.	17
									18
VI....	.30	Saugeen, Ont	20	19	Port Huron, Mich...	20	36	nw.	21
VII..	.42	Qu'Appelle, N. W. T.	24	29	Fort Custer, Mont..	22	48	nw.	24

I.—This area of high pressure was central north of the Saint Lawrence Valley on the morning of the 1st, or at the opening of the month, where the maximum pressure of 30.44 was observed at Rockliffe, Ont., at 8 a. m. It covered the entire region east of the Mississippi, while an area of decidedly low pressure was central north of Montana, and a second high area covered the north Pacific coast. It moved southward over New England and the middle Atlantic coast during the 1st and 2d, attended by clear and fair weather, and moved slowly eastward during the 3d and 4th, disappearing in advance of a storm centre which was passing eastward over the Lake region. The increase of pressure over Nova Scotia indicated that the movement was slightly to the north of east after passing beyond the limits of the United States.

II.—This area of high pressure was first observed west of Washington Territory on the 3d. Although the pressure had been previously high on that coast on the 1st, it decreased rapidly with the easterly movement, and the area of high pressure first named could not be traced east of the Rocky Mountains. It remained almost stationary on the north Pacific coast on the 3d, after which it extended eastward over the northern plateau region, remaining central in Idaho on the 4th, causing the first killing frosts in Wyoming and eastern Oregon on that date. It moved rapidly southeastward, crossing the central Rocky Mountain region during the night of the 4th, remaining central over Kansas during the 5th, but covering the greater portion of the country west of the Mississippi. Killing frost occurred at Cheyenne, Wyo., on the 5th, and light frosts throughout the Missouri Valley. It covered the central valleys on the morning of the 6th, and the northeast portion of the United States on the morning of the 7th, when it was central in northern New England, from which region it apparently moved directly eastward, passing over Nova Scotia, off which coast it was central on the afternoon of the 8th, the barometer remaining high, however, over the Saint Lawrence Valley, owing to the approach of a secondary area of high pressure, described as ii*a*. This secondary moved slowly eastward during the 9th and 10th, and was central to the east of Nova Scotia on the 11th, when a second re-enforcement, described as ii*b*, appeared to the north of the Saint Lawrence Valley, and after moving eastward during the 11th it apparently increased in energy and passed to the southward during the 13th and 14th, the movement being retarded after passing to the southeast of Nova Scotia. The accumulation of pressure in the northeast, due to these re-enforcements of high area number ii, apparently caused the tropical cyclone which was passing northward east of Hatteras to increase greatly in energy after passing the thirty-fifth parallel, and it also acted as a barrier, changing the course of the cyclone and actually driving it to the westward, although it is possible that a minor disturbance may have pursued a northeasterly course along the east margin of the Gulf Stream.

III.—This area of high pressure was apparently west of the north Pacific coast on the 8th and 9th, but it was first located as central near the coast of that region on the morning of the 10th. It followed rapidly the easterly movement of the extended low area which covered the plateau region on the 9th, and by the morning of the 11th it was central in the upper Missouri valley, extending from Lake Superior westward to the Pacific coast, attended by killing frosts in Washington Territory, Montana, and Dakota. The pressure increased during the easterly movement, and after reaching northern Dakota it moved northward and disappeared during the 13th to the northeast of Manitoba, and apparently extended the area of high pressure previously described as number ii*b*.

IV.—This area also first appeared west of the north Pacific coast, and, as in the one previously described, the direction of movement was at first to the northeast until it passed the coast line near the forty-eighth parallel on the 13th, and after which it moved directly eastward to Montana, where it was central on the 14th, and where the direction of movement changed to the southward. During the 14th it covered the

northern half of the Rocky Mountain region, extending from the Missouri Valley to the Pacific coast. It was apparently drawn southward immediately to the west of a barometric disturbance which passed rapidly to the northeastward from Kansas during the 14th, and after reaching central Kansas on the 15th the movement was to the northeast over the same course previously followed by the preceding area of low pressure. It decreased in energy after reaching the central valleys, and disappeared to the north of, and near, the Lake region by a gradual decrease of pressure.

V.—This area was central on the north Pacific coast on the 15th, and apparently formed a continuation of the preceding area of high pressure which at that time covered the eastern Rocky Mountain region. It extended eastward over the northwest portion of the United States, being central in Montana on the morning of the 16th, from which region it apparently extended southward over the eastern slope, extending from the Rocky Mountains to the lake regions, the Ohio valley and Gulf states on the 17th and 18th, attended by frosts as far south as northern Arkansas and the lower Ohio valley. It extended over the central Mississippi valley and thence westward to the Rocky Mountains on the 19th, after which it disappeared by a gradual decline in pressure without further easterly movement.

VI.—First appeared to the north of Minnesota on the 20th, the pressure being relatively low, but the rapid development of a barometric disturbance in the Lake region, causing the barometer to fall to 29.20, gave a well-marked barometric gradient in the direction of this area of high pressure, within which at that time the observed barometric reading was not above 30.04. It moved directly southeastward from Manitoba to Virginia during the 20th, 21st, and 22d, covering the central valleys, and afterwards the eastern portion of the United States, attended by general fair weather and light frosts as far south as North Carolina on the 22d. After reaching the Carolina coast on the 23d the course of movement changed to the northward, and it was apparently central over the Maritime Provinces on the 25th, from which region it moved eastward, disappearing over the Atlantic in advance of a storm which was central over the Saint Lawrence Valley on the 26th. The barometric pressure within this area of high pressure was relatively low, but it increased slightly during its easterly movement, and attained its maximum on the day it disappeared to the eastward.

VII.—After remaining almost stationary on the north Pacific coast during forty-eight hours this area advanced slowly to the eastward and was central near Olympia on the 23d. It extended southeastward, covering the plateau regions during the 24th and 25th, and passed to the eastward of Colorado on the 26th. It was probably the most extended area of high pressure observed during the month, and on the 26th and 27th the greater portion of the entire country was within its limits, it being central in eastern Kansas and extending from the Atlantic to the Pacific coasts. The maximum pressure of the month was observed at Leavenworth when the centre was near that station. It advanced slowly eastward over the southern states, causing light frosts in Kentucky and Tennessee on the 28th. The pressure decreased gradually as it approached the coast, and it disappeared to the east of North Carolina on the 30th, and probably changed its direction to the northeast, the pressure on the Nova Scotia coast increasing from two to three tenths of an inch during the last two days of the month.

AREAS OF LOW PRESSURE.

Ten areas of low pressure were observed within the limits of the stations of observation during the month of September, although a number of these disturbances passed eastward north of the United States, and were attended by no marked change in weather conditions. Four of the areas of low pressure reached the Atlantic north of the fortieth parallel, and only one tropical storm passed over the southern portion of the United States, although the most severe storm of the month possibly had its origin in the tropics, but passed northward over the ocean and developed its greatest energy after reaching the latitude of the middle Atlantic coast. The centre of this disturbance was at no time over the land, but was traced as an ocean storm, and the weather conditions attending its movements are exhibited on chart iv.

Generally the areas of low pressure observed during the month were more northerly than usual, and a number of secondary disturbances formed, which, owing to their brief duration, have not been traced as separate areas of low pressure.

The following tables exhibit the principal facts regarding these low areas:

TABLE I.

No.	First observed.			Last observed.		Duration.	Velocity per h'r.	Lowest pressure.		
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.			Date.	Station.	Reading.
		°	°	°	°	Days.	Miles.			Inches.
I	2	52	111	47	83	3.0	15.0	2	Swift Current, N. W. T.	29.36
II	5	53	100	52	89	1.5	16.0	5	Qu'Appelle, N. W. T	29.42
III	6	42	104	33	101	1.5	20.0	7	El Paso, Tex / Fort Elliott, Tex	29.70
IV	9	45	110	52	96	1.0	37.0	10	Fort Buford, Dak	29.62
V	11	38	113	49	73	4.5	20.0	14	Marquette, Mich	29.66
VI	15	52	107	49	70	4.5	20.0	19	Portland, Me	29.38
VII	18	49	97	50	62	3.5	25.0	20	Anticosti, G. of St. L	29.06
VIII	19	52	113	50	62	7.5	14.0	22	Minnedosa, N. W. T.	29.28
IX *	22	28	90	38	73	2.5	23.5	23	Pensacola, Fla	29.62
X	28	52	121	50	87	2.5	26.5	30	Port Arthur, Ont	29.24
Mean.		46	98	47	80	3.2	21.7			29.43

* While within limits of stations of observation.

TABLE II.

Number.	Maximum abnormal fall in pressure in twelve hours.			Maximum abnormal rise in temperature in twelve hours.			Maximum wind velocity.		
	Amount.	Station.	Date.	Amount.	Station.	Date.	Miles per hour.	Direction.	Date.
	Inch.			°					
I	.46	Qu'Appelle, N. W. T.	2	21	Qu'Appelle, N. W. T.	2	52	nw.	2
II	.34	Qu'Appelle, N. W. T. / Calgary, N. W. T	5	23	Medicine Hat, N. W. T	5	42	s.	6
III	.26	Pueblo, Colo	6	24	Pueblo, Colo	6	42	s.	6
IV	.32	Winnipeg, Manitoba.	10	14	Fort Buford, Dak	9	48	se.	10
V	.30	Denver, Colo / Dodge City, Kans.	12	17	Denver, Colo	12	42	s.	13
VI	.40	Portland, Me	19	17	Bismarck, Dak	15	50	nw.	19
VII	.46	Sault Ste. Marie, Mich	19	31	Medicine Hat, N. W. T	18	52	nw.	20
VIII	.40	Calgary, N. W. T	20	29	Medicine Hat, N. W. T	20	42	nw.	22
IX	.36	Atlanta, Ga	23	12	Chattanooga, Tenn	24	44	se.	24
X	.36	Medicine Hat, N. W. T / S'lt Ste. Marie, Mich	27 / 30	28	Swift Current, N. W. T	27	56	nw.	28

I.—This depression was central north of Montana on the morning of the 2d, it having been preceded in that region by the area of low pressure which moved eastward during the 1st and disappearing to the north of Minnesota on the 2d. When this disturbance appeared an area of high barometer covered the eastern portion of the United States, and the pressure was relatively high over the central Rocky Mountain and plateau regions. The barometer fell rapidly during the 2d at the Rocky Mountain stations and the centre of the disturbance passed from north of Montana southeastward to southern Dakota, the depression being elongated in a northeasterly direction extending from Colorado to Lake Superior. This trough of low pressure was attended by rapidly rising barometer to the westward, the difference of pressure being seven-tenths of an inch between Dakota and Washington Territory. The advance of this area of high pressure from the westward divided the barometric trough into two disturbances, one of which passed eastward over Lake Superior, as indicated on chart number i, while the other was forced southward to the west Gulf states by the area of high pressure, and disappeared by a gradual increase of pressure.

II.—The area of low pressure previously described was last observed as central north of Lake Huron on the 5th at 8 a. m., the morning weather map of that date exhibiting an extended barometric depression to the north of the United States, within which there were apparently two centres of disturbance.

The 8 p. m. report of the same date indicated low barometric pressure along the northern boundary of the United States from the Saint Lawrence Valley to British Columbia, with the minimum pressure to the north of Dakota. The areas of high pressure covered the Atlantic coast districts and the region from the central Mississippi valley westward to the Rocky Mountain regions. During the 6th there was a general movement of these conditions to the eastward; the area of high pressure, advancing more rapidly and inclining to the northeastward, covered the northeastern portion of the United States on the morning of the 7th, and either forced low area number ii to the northward beyond the limits of observation or caused it to disappear by increase of pressure; the appearance of a barometric disturbance north of Montana on the 7th would indicate that the last-named condition obtained.

III.—This was a minor disturbance which formed in the trough of low pressure attending the low area traced as number ii; it formed over the central Rocky Mountain region and moved directly southward from Nebraska to Texas from the 6th to the 8th, and disappeared in western Texas on the last-named date without causing any marked change in the weather conditions, although light rains occurred throughout the west Gulf states on the 7th and 8th.

IV.—The 8 a. m. report of the 9th exhibited an extended barometric depression covering the plateau regions from Mexico to the northern boundary of the United States, while there were also indications that an area of high pressure was advancing eastward from the Pacific. The 8 p. m. report of the 9th showed a slight advance of the barometric disturbance to the eastward when it was first marked as central in northwestern Wyoming Territory. It moved rapidly to the northeastward during the succeeding twenty-four hours and disappeared to the north of Minnesota during the night of the 10th, there being no trace left of this depression on the a. m. weather chart of the 11th, which exhibited two areas of high pressure covering the northern portion of the country from the Saint Lawrence Valley to the Pacific coast.

V.—This depression originated over the southern plateau region, and was first observed as central in southern Utah on the afternoon of the 11th. It moved directly eastward during the 12th and 13th, passing over Colorado and reaching western Kansas on the morning of the 14th, when the advance of an area of high pressure from the north caused the defining isobars of this disturbance to become extended in a northeasterly direction, a narrow barometric trough attending this disturbance apparently bounding the southeast quadrant of the advancing high area when the latter was central in northern Montana, and the depression extending from New Mexico to Lake Superior. During the 14th the southeasterly movement of the area of high pressure caused a rapid transfer of the centre of this disturbance from Kansas to Lake Superior, the barometric trough advancing to the eastward and southward within which heavy rains occurred as it passed over the central valleys. The secondary disturbances which developed in the southern portion of the trough were quickly replaced by the advancing area of high pressure, while the centre of disturbance to the north advanced eastward from Lake Superior to the lower Saint Lawrence valley, where it disappeared on the 16th.

VI.—Appeared north of Montana on the 15th and passed southeastward to Minnesota as a disturbance of slight energy. The direction of movement changed on the 16th to the eastward, the centre passing over Lake Superior to the region north of Lake Huron, where it was located on the afternoon of the 17th. The lowest isobar of 29.90 extended southeastward over northern New England, and there were indications that a secondary disturbance would develop in that region. The easterly movement continued during the 18th, the pressure decreasing slowly at the centre, which on the afternoon of the 18th was near the northern portion of Maine, where the barometric pressure was about 29.76. During the night of the 18th this disturbance developed great energy over a small area on the east New England coast. The barometer fell four-tenths of an inch at Portland in twelve hours, and severe gales occurred on the east and southeast New England coast. Attending this sudden development of energy in the southern portion of this depression, the barometer remained almost stationary to the northward, while the well-marked depression which was central on the New England coast on morning of the 19th passed quickly to the northward and could not be traced after the succeeding telegraphic report. Its rapid disappearance was probably due to the proximity of low area traced as number vii.

VII.—Appeared to the north of Dakota on the 18th when an area of high pressure covered the greater portion of the country, the latter being central in the upper Mississippi valley. The early movements of this disturbance can only be approximately traced, but it apparently moved southeastward from the 18th to the 20th, passing from the region far to the north of Dakota to the upper Saint Lawrence valley. As it approached the vicinity of Lake Huron it increased greatly in energy, causing severe westerly gales on the lakes during the night of the 19th. On the morning of the 20th the barometer had fallen to 29.20 at Parry Sound, Ont., when the centre of disturbance was near that station. After the centre of disturbance reached the upper Saint Lawrence valley on the afternoon of the 20th the direction of movement changed to the northeast, and the disturbance became greatly extended in area, the barometric pressure at the centre increased slightly during the change in direction of movement, but afterwards decreased until the minimum of 29.06 was reached at Anticosti, Gulf of Saint Lawrence, on the morning of the 22d, when severe westerly gales were reported over the Maritime Provinces.

VIII.—Apparently developed in the Rocky Mountain regions to the north of western Montana, where it was observed on the 19th. It passed slowly eastward north of the United States, and was apparently retarded in its easterly movement until it passed to the eastward of Lake Winnipeg. When central north of Minnesota the barometric pressure at the centre was below 29.28, when there were indications that this disturbance would cause decided changes in the weather conditions in the northern portion of the United States. It passed eastward, however, far to the north of the lake region, the pressure apparently increasing at the centre until the disturbance reached the lower Saint Lawrence valley, when a slight decrease in pressure was observed. Showers occurred throughout the Lake region, and on the Atlantic coast, attended by fresh and brisk westerly winds. After passing over the lower Saint Lawrence valley it was apparently joined by the disturbance traced as number ix, which passed off the middle Atlantic coast on the morning of the 26th, this storm having greatly decreased in energy, and by the afternoon of the 26th the two depressions had approached each other so that both were included within a barometric trough extending southward over New England and to the fortieth parallel. The easterly course apparently continued after the 26th, and it disappeared over the Atlantic during the 27th, the barometer continuing low, however, in and over the Maritime Provinces until the 29th.

IX.—Was the only tropical storm occurring during the month the centre of which passed over the continent. From numerous vessel reports and the accompanying data and descriptions prepared by Rev. Father Benito Viñes, S. J., the approximate course of this storm previous to the 22d is indicated on chart number i. While the regular telegraphic report would indicate that within a very extended area of barometric depressions two, and possibly three, disturbances may have existed, it is probable that the one traced as number ix continued its course as indicated, and certainly it is the only cyclonic disturbance observed in the Gulf which reached or passed over any portion of the United States. At 8 p. m. of the 22d this storm was apparently central near the mouth of the Mississippi to the southeast of Port Eads, La., but its presence could not be definitely determined at that report. Twelve hours later the centre had advanced to the vicinity of Mobile, Ala.; southeasterly gales were reported at Pensacola, Fla.,

while the wind was light and from the north at Mobile, Ala. The course continued northeasterly, passing over Alabama, northern Georgia, and central North Carolina during the succeeding twenty-four hours, attended by from two to three inches of rain at stations near the centre of disturbance, and southeasterly gales along the south Atlantic coast. The pressure increased slowly at the centre during the northeasterly movement with loss of energy, and when the disturbance reached the middle Atlantic coast the barometer at the centre was 29.88, and the greatest maximum velocity of wind was thirty-six miles per hour. As previously stated, it probably joined with low area viii in the lower Saint Lawrence valley.

Notes and extracts relative to the early history of this storm furnished the Chief Signal Officer through the courtesy of Rev. Father Benito Viñes, S. J.:

Havana, Sept. 13th, 1.00 p. m.: some indications of cyclonic movements are observed in the South Sea. The centre remains approximately to the S. ¼ S. W. from Havana at a great distance. If the season were more advanced a storm from this quarter could be very dangerous; but being at present in the middle of September, it is probable that the present disturbance, following the general law of the trajectories formulated by me in the "Ciclonoscopio de las Antillas para uso de los Marinos," is moving from the west to the south of the island.

Havana, Sept. 13th, 7.00 p. m.: the cablegram of Mr. Ramsden, which I received this evening, indicates a new centre of cyclonic disturbance south of Santiago de Cuba. This new storm appears to be more active and better organized than the one which is discovered south of Havana. It is very possible that the whole of these two simultaneous disturbances will constitute one vast depression in the South Sea, with two centres of cyclonic aspiration. Nothing is known at present regarding the direction of the trajectory of this new disturbance. The probability is that it advances to the west toward the vicinity of the Canal of Yucatan, and accordingly as its direction inclines more or less to the north of west, it will be felt with more or less intensity in the extreme western part of the island.

Santiago de Cuba, Sept. 13th, 10 a. m.: barometer 29.88; 2 p. m., 29.87; 3 p. m., 29.79; wind nne., velocity 15 miles; cirro-cumulus from ene., cumulus, high, from se.; cirrus from s. Holland Bay, wind n., gusts of wind; sea somewhat risen.

Havana, September 14th, 1 p. m.: the cyclonic disturbance of which I spoke in my first communication has come to us somewhat from the west; so that at present its centre remains approximately to the south-southwest. The ascending current in the centre of this disturbance is quite intense and rises to a great altitude, giving origin to brilliant solar halos. According to the cablegram just received the position of the centre of the other disturbance is apparently better determined and its position is approximately to the south-southeast of Santiago de Cuba and southeast of Jamaica. This confirms me in the opinion that the whole of these two disturbances forms a vast depression which embraces the whole of the South Sea. The case thus stated does not fail to present difficult complications hard to solve with the few observations which we have at our command. Already in Havana the upper currents are influenced by the other centre which threatens us in the southeast. In general, without doubt, it can be said that these vast depressions are not so much to be feared as the cyclones of a short radius. Besides, it must be remembered, as I have said before, that in these vast depressions the greater force of the wind and the squalls are not in the central region but on the outer edge. This explains, apparently, the interruptions of the telegraphic line in San Domingo, where winds from the 1st to the 2d quadrants have prevailed. While the cyclonic ring is advancing to the west the weather along the coast might become worse, with variable winds, squally and rainy weather, those from the northeast predominating and moving to southeast, with more or less intensity, according to the different localities that it strikes.

Santiago de Cuba, September 14th, 7 a. m.: barometer 29.82; wind ne., velocity seven miles per hour, cloudy, cirro-stratus from se., nimbus from ne. Jamaica: barometer 29.82, calm, covered, cirro-cumulus from ne. San Domingo: telegraph lines interrupted. Trinidad: last night, 13th, barometer 29.90; to-day rising; tempest from sw., sea agitated, wind increasing; Santiago de Cuba, 14th, 2 p. m.: barometer 29.80, wind ne., variable, velocity two miles per hour, light rain; 3 p. m., barometer 29.89, wind n., light rain. Island Barlovento: wind fresh se.; Saint Thomas, s.; Puerto Plata, ne. Cienfuegos, 2 p. m.: barometer 29.89, variable breezes ene., inclining to the n., cumulus from ne.

Santiago de Cuba, 15th, 7 a. m.: barometer 29.78, wind se., velocity five miles, variable, mists, nimbus from se.; continued rain, some strong gusts of wind from ene. at dawn; at 3 a. m., barometer 29.72; 3 p. m.: barometer 29.84, wind se., velocity three miles, variable, light rain, nimbus from se. and sse. Cienfuegos, 15th, 2 p. m.: barometer 29.72, wind nnw., gusts of wind ne.; 3 p. m.: barometer 29.76, wind ese, nimbus strong from ne. Quemado de Güines, 15th, 9.15 a. m.: 14th, 10 a. m., barometer 29.88, wind n.; suffocating heat; 10 p. m., barometer 29.80, wind n., slight breeze; in the evening stronger, like 13th; 15th, 4 a. m.: barometer 29.76, wind n., breeze; squalls from 1.30 a. m.; 8.30 a. m.: barometer 29.80, sky covered, light rain e. and s., great belts of dark cumulus, wind n. and ne. Santa Clara, 15th, 12.15 p. m.: barometer 29.45; wind light, from nne., with oscillations to the n. and ne.; squalls in the morning; direction of the clouds from ne. to sw. Santa Clara, September 15th: barometer 29.41, with tendency to fall; wind nne.; sky covered; very dark and cloudy weather in the third and fourth quadrants; gusts of wind and rain. Pinar del Rio, September 15th: barometer 29.65; wind nw.; cirro-cumulus from the n. Quemado de Güines, September 15th, 3 a. m.: barometer 29.80; wind ne., with slight gusts of winds and light rains; bad aspect of the sky to the se. and s.; at 3.25 p. m.: barometer 29.69; wind ne., slight gusts; light rains; cumulus low from ene.; in second quadrant, s. and w., followed by bad aspect of weather.

Havana, September 16, at 1 p. m.: the cyclonic disturbance which appeared on the 14th to the south-southwest of Havana moved towards us from the west. On the 15th in the morning the storm of Jamaica approached from the southeast, which was more intense and better organized than the former, and it increased in intensity. To-day it moves from the south toward the west. The direction of the trajectory is approximately to the west-northwest towards the coast of Texas. I consider the whole of these two disturbances, according to indications, to be an extensive area of low barometer which embraces the two cyclonic centres.

Havana, September 17th, noon: the central region of relative calm of the extensive area of low barometer, and the cyclonic ring of large clouds, winds, and squalls which surround this vast depression, of which I spoke in my former report, could not have been more marked yesterday evening, 16th; but while we in Havana were surrounded by a relative calm, the squalls ceased, the sky cleared up letting us see the solar disc encircled by halos, in the midst of a calm, with a suffocating, sultry heat and very low barometer; in Cienfuegos there was a cyclonic ring, with rising barometer, and heavy squalls from the south. The showers at dawn, with light winds and gusts, and some thunder, were owing, in my opinion, to the tail end of the Jamaica storm, the vortex of which was west-southwest. The clear weather which we had afterwards relates to the intermediate space between this storm and the cyclonic ring of the whole disturbance.

San Juan y Martinez, September 16th, 6 p. m.: barometer 29.72; cirrus clouds from s.; cumulus clouds to the w.

Havana, September 18th, noon: the nebulous edge of the latter portion of the depression has been crossing by Havana during the evening of yesterday the 17th, and last night, and this morning we find ourselves still in its outside portion. Yesterday evening we had brisk winds of 22 miles per hour, with gusts of 35 miles per hour; sky of a very stormy aspect and strong currents in the region of the rain-clouds.

Havana, September 19th, 9 a. m.: in the "Diario de la Marina" of to-day, in the section with the heading "The Weather," I read the following report, which confirms what has been said in relation to the vast depression which crossed to the south of the island in a direction to the wnw., toward the coast of Texas: according to telegram from Cayo-Hueso, received in the meteorological division, etc., the effects of the anterior edge of the depression must yesterday morning, the 18th, have been felt on the coast of Texas, while in Havana they were just receiving the outer edge of the following part (posterior part) of the nebulous disc of the same, so that the area of low barometer is very vast, since it embraces in its extremes the whole Mexican dominion and more. It is probable, in conformity to general laws of the trajectories in the different months, that this vast storm recurves on the coast of Texas, causing terrible inundations and disasters in an extensive zone. The steamboat "Mascotte," on its journey from Tampa to Cayo-Hueso, was on the evening of the 17th overtaken by hurricane winds from east shifting to southeast which finally acquired a velocity of sixty-five miles per hour. Cienfuegos, September, 19th, 2 p. m.: barometer 29.84; cirrus sky, cloudy, west; cirro-cumulus moving from west ¼ northwest; slight winds, south-southwest; 3 p. m., barometer 29.84. Quemado de Güines, September 18th, 2 p. m.: 18th, 10 a. m., barometer 29.88; wind south, breeze; at 1 p. m., barometer 29.80; wind south-southwest.

[By telegraph to the New York Herald.]

CITY OF MEXICO, *October* 4, 1889.—A full report of the great cyclone on Carmen Island, off the coast of Campeche, has been received. The cyclone started about 2 o'clock on the afternoon of the 18th ultimo, and was heralded by a rapidly falling barometer. It did not, however, gain its full strength until night. The wind then shifted from the west to due south with an impetuosity that caused the vessels in the Carmen harbor to drag their anchors. Masts were snapped and sails torn in shreds. The following morning the shores were strewn with wreckage, there being only one vessel—the "Jova Del Lobregat"—that weathered the great gale out of thirty-five vessels of all kinds in the port. When the storm commenced all of the schooners that had sought refuge at a point called Quintilla were also wrecked.

The hurricane uprooted great trees, which fell upon houses in Carmen, destroying in all over one hundred and damaging two hundred and fifty others. The big extract factory, the Parochial Church, and the new hospital were seriously damaged. The authorities are now busily engaged in removing the trees from the streets and searching the ruins for dead bodies. So far only one death from the storm is reported, the captain of the brigantine "Enrique," Mr. R. Alcali, who was killed on the shore.

The losses occasioned in the city by the storm are estimated at $500,000. News of great destruction to other towns near Carmen is now coming in. Pariscada and Partido have suffered the loss of many houses. In the vicinity of the last named town all crops are a complete loss. In Aquada de Purto Real, all the houses, with the exception of four, were destroyed by trees falling upon them. With the reports so far received the loss will not fall short of $1,000,000.

X.—This disturbance probably originated on the north Pacific coast. It was central north of Washington Territory on the morning of the 28th, with severe southerly gales reported at the mouth of the Columbia River. These gales continued during the 28th, while the centre of disturbance apparently moved rapidly eastward, passing to the north of Montana and Dakota. After passing to the eastward of the Rocky Mountains the pressure decreased at the centre, the barometer falling to 29.24 in Manitoba on the morning of the 30th. At the close of the month this depression was apparently central north of and near Lake Superior, the barometric pressure at Port Arthur, Ont., being 29.24 at 8 p. m. of the 30th, and brisk to high southwesterly winds were reported from the lake stations.

NORTH ATLANTIC STORMS FOR SEPTEMBER, 1889 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of the depressions that appeared over the north Atlantic Ocean during September, 1889, are shown on chart i. These paths have been determined from international simultaneous observations by captains of ocean steamships and sailing vessels received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service." Descriptions of the storms that appeared over the West Indies, the Caribbean Sea, and the Gulf of Mexico have been received through the courtesy of the Rev. Father Benito Viñes, S. J., Director of the Magnetic and Meteorological Observatory of the Royal College of Belen, Havana, Cuba, and the thanks of this office are also due to co-operating observers in the West Indies and the Bermudas for reports rendered relative to these storms.

Seven depressions have been traced for September, 1889; the average number traced for the corresponding month of the last six years being 9.3. Of the depressions traced for the current month, two were continuations of areas of low pressure which first appeared over the North American continent; two were of tropical origin, one of which advanced from east of the Windward Islands to the Virginia coast from the 1st to 13th, and the other recurved northeast of the Windward Islands on the 4th and 5th and apparently passed thence northeastward to the Azores by the 11th; one depression, described under the heading "Areas of low pressure," advanced westward over the Caribbean Sea from the 13th to 17th, and from the 18th to 22d probably moved westward over Yucatan and recurved northward to the middle Gulf coast; three first appeared over mid-ocean; and two advanced from the Gulf of Saint Lawrence northeastward over Newfoundland and disappeared north of the region of observation. No storm traversed the ocean from coast to coast, and the movements of the depressions over the north Atlantic were irregular. Over the western portion of the ocean disastrous storms and unusually high tides occurred along the coast from New England southward to the Carolinas, attending the advance of the depression traced northwestward from the Windward Islands, and in the Gulf of Mexico a storm devastated the Campeche coast during the latter part of the second decade of the month. On the 19th a severe storm was central on the middle New England coast, while during the last decade of the month unsettled weather prevailed over New England and the Canadian Maritime Provinces, attending the passage of depressions over the Gulf of Saint Lawrence and Newfoundland. Over mid-ocean the pressure continued low, with fresh to strong gales, from the 1st to 13th, and from the 22d to 26th stormy weather prevailed north and northeast of Newfoundland and the Grand Banks. Over the eastern part of the ocean in the vicinity of the British Isles fair weather prevailed until the 8th, from which date until the 12th the influence of the depressions over mid-ocean was felt, and from the 19th to the 24th the pressure was low and the weather unsettled over and near the British Isles.

Compared with the corresponding month of previous years, the storms that appeared over the north Atlantic Ocean during September, 1889, were slightly deficient in number, although their slow and irregular movements over mid-ocean occasioned a continuation of stormy weather along the trans-Atlantic steamship routes throughout the greater part of the month. The storms traced over the north Atlantic in September for preceding years varied in number from five in 1883 to thirteen in 1884. Well-defined and destructive September cyclones have averaged about one per year over the West Indies, their usual path being westward from or near the Windward Islands to the Gulf of Mexico where they recurved northward. Among notable September West Indian storms charted and described in the REVIEW are: 1882, storm appeared north of San Domingo on the 2d, moved westward over Cuba to the central Gulf where it recurved to the Alabama coast by the night of 9th, following the usual parabolic path. 1883: storm moved from off the eastern extremity of Cuba on the 6th northwestward over the Bahamas to the North Carolina coast by the 11th. 1886: storm off the west Gulf coast moved northward to the middle Texas coast from the 22d to 24th. 1887: one storm advanced from east of the Windward Islands on the 11th westward over the Caribbean Sea and north of west over the Gulf of Mexico to the Texas coast by the 21st, and one moved northeast from the western extremity of Cuba over the Bahamas. 1888: one storm moved from north of Puerto Rico on the 1st westward over Cuba and Yucatan to the Mexican coast near Vera Cruz by the 7th, a very unusual course, and one passed from the Bahamas westward over southern Florida where it recurved northward during the 8th and 9th.

The following are brief descriptions of the depressions traced for September, 1889:

1.—Vessel reports indicate that this disturbance existed to the eastward of the Windward Islands on September 1st, probably central in latitude N. 14°, longitude W. 57°. Later reports indicate that it moved westward, passing over Saint Christopher during the night of the 2d, where the barometer fell to 29.50 (749), with wind northeast. From 10.15 p. m. of the 2d to 12.45 a. m. of the 3d winds light and calm, with falling barometer. At 2 a. m. of the 3d, the barometer had fallen to 29.38 (746), and the wind had shifted to southwest, indicating that the centre of the disturbance had passed to the northwest of this island. The approximate course of the centre of this storm is given on chart i, and the meteorological conditions attending its movement from day to day are exhibited on chart iv, upon which are traced isobarometric lines for each two-tenths of an inch from observations taken at noon, Greenwich time, by steamships and sailing vessels, and observations taken at 1 p. m., Greenwich time, at land stations. In tracing the isobarometric lines bounding this disturbance care has been taken to accurately represent the data received, and lines over extended areas from which reports have not been received depend for their values on adjacent reports. It will be seen from chart iv that this storm was central near Saint Thomas on September 3d, there being an extended area of barometric pressure covering a greater portion of the West India Islands at noon of that date, while a second barometric depression covered the middle north Atlantic, and an area of high pressure extended along the coast of the United States from Georgia to New England. On the 4th the depression over the West Indies had moved slightly to the northwestward, and vessel reports show that severe storms were experienced over the ocean in latitude N. 22° 55′ and 36° 55′, longitude W. 55°. The centre of disturbance passed to the northwestward near the Island of Saint Thomas on the 3d, and was near to and north of the Island of Puerto Rico on the 4th. It was especially severe and caused much damage to crops over these Islands, but it did not extend over San Domingo and the Islands to

the westward as a storm of marked energy. On the 5th it was probably central north of Puerto Rico near latitude N. 21°, longitude W. 67°, with an apparent tendency to move northward. Marine observations on the 6th indicate an extended depression covering more than ten degrees of latitude. Within this depression and near the extremities the following vessel reports indicate two centres of disturbance: Schooner "Gertrude," "6th, in N. 28° 44′, W. 64° 52′, barometer 29.52 (750), wind south, force 12; at 7 a. m., in N. 27° 32′, W. 64° 49′, barometer 29.49 (749); shifts of wind, se., sse., s., and sw.; highest force of wind 12." S. S. "Excelsior," "6th, in N. 28° 41′, W. 78° 18′, barometer 29.52 (750), wind northeast, force 4." No reports were received from the central portion of this barometric trough covering the 6th, but from observations taken in the vicinity the indications are that the barometric pressure was greater at intervening points than at the two centres of disturbance above referred to. Considerable weight is given to the observations above quoted, as these vessels afterwards approached the coast, and the readings of the barometers compared with those of land stations showed a probable error of less than one-tenth of an inch. The centre of disturbance in the eastern portion of the barometric trough developed the greatest energy, and its tendency to recurve to the northeast between the 5th and 6th would indicate that it was the continuation of the storm traced over the Windward Islands. There was an apparent tendency for this disturance to recurve after the 5th and follow a normal northeast track, but the presence of an area of high pressure to the north and east interrupted this northeasterly movement and changed the course to the northwest. The mid-day report of the 7th indicated that the principal disturbance moved to the northwest, while that to the westward had disappeared.

During the 7th and 8th no reports were received from the central area covering at least 200,000 square miles, and it is therefore impossible to definitely locate the centre of the disturbance on those dates. Its northwesterly course continued until the 11th, the storm evidently increasing in energy as it approached the coast. After the centre reached N. 38°, W. 72° it was apparently forced to the southwestward by a still further re-enforcement of the area of high pressure to the northward, which not only retarded its easterly movement but caused it to disappear by a gradual increase of pressure while central on the middle Atlantic coast. The westerly movement of areas of low pressure is unusual in high latitudes, and when such movements occur they are usually attended by areas of high pressure to the northward which are apparently drawn to the east or southeast by a barometric depression far to the eastward. [Such a storm occurred on March 25, 1878, when the centre of the disturbance passed from east of Newfoundland westsouthwest over New England and the middle Atlantic coast, the pressure decreasing more than two-tenths of an inch during the westerly movement.] The approach of the centre of disturbance toward the coast was attended by great increase of energy. While this storm was severe and caused great damage to shipping and loss of life, the records of this service show numerous instances of storms which were more destructive both to life and property. "The hurricane of August 14 to 27, 1873, was the most destructive storm that ever visited the Atlantic coast; it recurved between the island of Bermuda and Cape Hatteras, and its centre at no time touched the coast line, although warning signals were ordered for stations on the northeast coast. Twelve hundred and twenty-three vessels were known to have been destroyed, and two hundred and twenty-three human lives were definitely reported as lost. The storm of September 15, 1875, caused a loss of one hundred and seventy-six lives, and three-fourths of the town of Indianola, Tex., was swept away. The hurricane of October 21 to 24, 1878, probably caused more damage. It entered the United States near Wilmington, N. C., and moved due north, and passed over Washington City and eastern Pennsylvania, after which it curved eastward, and crossing New England left the coast near Portland, Me. At Philadelphia, Pa., over seven hundred substantial buildings were totally destroyed or seriously damaged, bridges injured, and twenty-two vessels sunk, entailing a loss variously estimated at from $1,000,000 to $2,000,000. Other loss of life and great damage by freshets and winds occurred elsewhere in Pennsylvania. A large number of steamers, ships, and coasting vessels were dismantled, wrecked, or sunk along the New Jersey, Virginia, and North Carolina coasts, entailing loss of life and immense pecuniary damage. The wind reached seventy-two miles per hour at Philadelphia, and from eighty to eighty-eight miles along the coast. The hurricane of August 16–20, 1879, entered the United States at Cape Lookout, N. C., and skirted the Atlantic coast thence northeastward to Eastport, Me. An enormous amount of damage resulted from this storm. Not only was the damage to inland property very excessive, but the damage to maritime interests may be estimated from the fact that over one hundred large vessels were shipwrecked, dismantled, or disabled, and two hundred yachts or smaller vessels injured. The wind reached a measured velocity of one hundred and thirty-eight miles per hour at Cape Lookout, where the anemometer was carried away. The barometer fluctuated with extraordinary rapidity, there being a fall of .85 inch in five and one-half hours off the New Jersey coast, followed by a rise of .93 inch in six and one-half hours. August 23d–28th, 1881: a storm entered the United States near Savannah, Ga., and followed a very unusual course to the northwestward to Minnesota. The loss of life and damage to property in Charleston, S. C., Tybee Island, and along the adjacent coast was very great. About four hundred persons lost their lives, and hundreds of houses were totally destroyed. The loss of property was estimated at over one and one-half million of dollars. A similar storm passed over Charleston August 23d–24th, 1885, where damage to the extent of nearly two millions of dollars was done, and twenty-one lives were lost. On August 19–20, 1886, a storm completely destroyed Indianola, Tex., which was nearly swept away in September, 1875. Not a house was left standing, and over twenty lives were lost. Galveston, Tex., also suffered great damage."

The following telegrams and reports furnished by the Rev. Benito Viñes, S. J., are descriptive of this depression and of the destructive storms which attended it over the West Indies: "3d.—Saint Christopher, W. I.: last night, 2d, barometer, 29.50 (749); wind, ne. From 10.15 p. m., 2d, to 12.45 a. m., 3d, wind light and calm with falling barometer; 2 a. m., 3d, barometer, 29.38 (746), wind changing to sw.; 2.30 a. m., 3d, barometer, 29.70 (754), wind and sea dreadful. English s. s. 'Roraima' and schooner 'Circe' were lost; the crews were saved. Havana, Cuba, 3d: a cyclone of great intensity appeared this morning near Santa Cruz and Saint Thomas. The vortex was approximately to the ese. of Puerto Rico. Santiago de Cuba: at Puerto Rico yesterday, 2d, at 7 a. m., barometer, 29.92 (760); at 3 p. m., 29.84 (758); to-day, 7 a. m., 29.76 (756); wind, nne. The barometer at this place at 3 p. m. to-day, 29.85 (758); at Santa Cruz, at 3 p. m. to-day, barometer, 29.65 (753); wind, sw., cyclone path, wnw. Santa Cruz, 5 p. m.: cyclone very severe from 9 a. m. to noon; wind yet strong from sw.; no communication to-day with Saint Thomas. San Domingo, 4 p. m.: barometer, 29.72, (755); strong north sea; thunder-claps. Havana: the last cablegrams received indicate that the vortex of the cyclone remained this afternoon between Santa Cruz and Puerto Rico, and that the trajectory of the cyclone is to the wnw. Supposing this direction, the storm will probably cross over the island of Puerto Rico, will later touch the north coast of San Domingo, and will make itself felt with more or less intensity on the north coast of Cuba from the 6th to the 7th. 4th.—Santiago de Cuba: 7 a. m., barometer, 29.88 (759); cirro-cumulus from e., high cumulus from ene.; 2 p. m., barometer, 29.81 (757), blue sky with only one current cumulus high from ene.; wind se., fine weather; 3 p. m., barometer, 29.81 (757), mist, wind n. and light variable; 10 p. m., barometer, 29.90 (759), calm, cloudy. San Domingo: 9 a. m., barometer, 29.80 (757), clear, wind n., strong. Puerto Plata:

3.45 p. m., wind nnw., light, rainy, swelling sea. San Domingo: 5 p. m., a violent storm with torrents of rain since 1 p. m., barometer, 29.75 (756), wind changed from e. to nw. Saint Thomas: the storm of yesterday, 3d, caused great damage in the country; the barometer fell to 28.97 (736). The telegraphic and traffic lines are interrupted. Santa Cruz: during the storm of yesterday, 3d, much damage was caused. Havana, 4th: from cablegrams received here it is understood that the cyclone passed a short distance north of Saint Thomas, and this morning its vortex remained approximately to the wnw. of the capital of Puerto Rico, slowly advancing to the north coast of San Domingo. According to reports it appears that the storm is of great diameter and intensity, and notwithstanding it is announced from Santiago de Cuba with path towards wnw., its trajectory appears to incline somewhat more to the n., in which case it is possible that its influence, not its effects, will be felt in this island. 5th.—San Domingo: 7 a. m., barometer, 29.88 (759), cloudy, wind n., light; storm ceased 11 p. m., 4th. Santiago de Cuba: 7 a. m., barometer, 29.89 (759), wind ne., light, cloudy. Havana, 5th: according to telegrams just received the winds from the left side of the trajectory of the cyclone have at present made themselves felt very forcibly on the north coast of San Domingo, and it is probable that from the 6th to 7th, according to the general rule, it will make itself felt with more or less severity on the north coast of the eastern part of Cuba. The cyclone is apparently violent and of short radius, and advances slowly. The direction of the trajectory, which in the neighborhood of Puerto Rico will be toward wnw., approximately, will probably incline more to the n. in proportion as the cyclone advances in latitude, thus preparing to recurve, which will probably take place in the proximity of Florida in a latitude between 27° and 29°. The reports confirm the opinion of yesterday with regard to the course of the cyclone; in diameter it is not apparently as great as thought in the beginning. 6th.—Havana: meteorological reports indicate a rise of the barometer and good weather; from this I deduce that the cyclone followed a very large trajectory; there is, in consequence, no probability that it can pass over this island. The vortex of the cyclone passed over the island of Saint Christopher from 10 p. m. to midnight of the 2d, and on the 3d it crossed a short distance north from Saint Thomas, and from the strong velocity of the wind, the low minimum barometer, and the difference of barometer between Saint Thomas and San Juan de Puerto Rico, a difference of more than .71 (18), between points in near proximity to each other, makes me suppose a strong barometric gradient and a very rapid barometric fall, which only verifies itself in violent cyclones of a certain radius and in the proximity of the vortex. From the known position of the cyclone on the 4th and 5th, the velocity of translation of the storm is shown to be a little more than eight miles per hour, a movement which is indeed remarkably slow. The diameter of the vertical calm during its passage over Saint Christopher was, according to this, a little more than sixteen miles."

The following reports indicate the character of the disturbances which attended this depression off the coast of the United States. The first positive information that this storm had reached the coast of the United States was received from the Signal Service station at Block Island, R. I., at 8 a. m., on the 9th, when during a sudden squall, the wind rose to forty-eight miles per hour from the northeast. The observer reports that the storm did not begin until 5 p. m. of that day: Atlantic City, N. J.: the high northeast winds which prevailed from the 8th to the 12th attained a maximum velocity of seventy-two miles per hour at 2.30 p. m. of the 10th, causing the tide to rise very high on those dates, the highest point being reached during the night of the 10–11th, when the meadows along the water front and a portion of the city were inundated. Great destruction to property occurred in this city and along the beach by the wind and tide.—*Report of W. J. Blythe, observer, Signal Corps.* Philadelphia, Pa.: high northeast wind, maintaining a steady velocity of forty to forty-five miles an hour, prevailed throughout the day of the 10th, and continued into the day of the 11th, with an extreme velocity of sixty miles per hour on the 10th. All telegraphic communication between here and Atlantic City was cut off during the 10th and 11th.—*Report of L. M. Dey, observer, Signal Corps.* Egg Harbor City, N. J., 10th: during last night and to-day a severe northeast storm has prevailed. Much damage has been done to crops and fruit trees in this section.—*Report of H. Y. Postma, voluntary observer.* Baltimore, Md.: the storm which prevailed with great persistence from the 10th to the 12th was very severe on Chesapeake Bay. All steamers arriving in this port have been delayed six to twelve hours by the storm.—*The Baltimore, Md., Sun, September* 12. Lewes, Del.: a most destructive storm raged in this section from the 8th to the 12th. The telegraph station was washed away, the marine hospital dashed from its moorings, and the life-saving station, located forty feet above high water mark, was flooded and the foundation undermined. Humphreyville, a suburb between the town and the beach, was submerged, and its two hundred inhabitants fled for their lives. Thirty-one vessels are known to have been wrecked or washed ashore, and the damage to shipping is estimated at $570,000. The total number of lives lost will probably exceed forty.—*The Baltimore, Md., Sun, September* 13. It is estimated that the bulk of the losses caused by the storm to railroad and vessel owners will reach $1,786,000.—*The Record, Philadelphia, Pa., September* 13. Reports from Signal Service stations show that violent storms and unusually high tides occurred along and off the Atlantic coast from New England to North Carolina from the 8th to the 12th.

Upon the receipt of information from the West Indies that a severe storm existed over the Windward Islands, the principal ports on the coast of the United States from New England to Florida, and the Hydrographic Office, U. S. Navy, were notified. The probable course of the storm was also indicated, as shown by the following telegrams, sent by order of the Chief Signal Officer:

WASHINGTON, D. C., *September* 5—10.35 a. m.

Secretary, Maritime Exchange, New York City:

Cyclone in West Indies passed over San Domingo yesterday at 6 p. m. Variable winds from east to northeast. ALLEN.

WASHINGTON, D. C., *September* 5—2.58 p. m.

Observers, Norfolk, Wilmington, Southport, Charleston, Savannah, and Jacksonville:

Cyclone reported north of Hayti apparently moving north. ALLEN.

The following correspondence was had with Capt. J. M. Lachlan, General Manager of the United States and Brazil Mail Steamship Company, relative to this storm:

[Telegram.]

OFFICE OF THE UNITED STATES & BRAZIL MAIL STEAMSHIP COMPANY,
NEW YORK CITY—6.28 p. m., *September* 10, 1889.

GENERAL GREELY, *U. S. Signal Service, Washington, D. C.:*

This company intends to dispatch their steamship "Advance" to-morrow, 11th, to Newport News, en route for Brazil, calling at Saint Thomas. Please wire indications and recommendations as to judiciousness of postponement. We are informed heavy meteorological disturbances exist off Hatteras region. Will thankfully pay for reply.

J. M. LACHLAN,
General Manager U. S. & B. M. S. S. Co.,
Mills Building, 23 Broad St., New York City.

[Telegram.]

WASHINGTON, D. C., *September* 10, 1889—9.30 p. m.

CAPT. J. M. LACHLAN, *General Manager U. S. & B. M. S. S. Co.,*
Mills Building, 23 Broad St., New York City:

Dangerous to sail; violent gale off Hatteras. Will wire you again by 11 a. m. to-morrow morning. GREELY,
Chief Signal Officer.

[Telegram.]

WASHINGTON, D. C., *September* 11, 1889—11 a. m.

CAPT. J. M. LACHLAN, *General Manager U. S. & B. M. S. S. Co.,*
Mills Building, 23 Broad St., New York City:

Gale still continues from New York to Hatteras; dangerous to sail. If storm has abated by night will advise you. GREELY,
Chief Signal Officer.

[Telegram.]

WASHINGTON, D. C., *September* 11, 1889—10.50 p. m.

CAPT. J. M. LACHLAN, *General Manager U. S. & B. M. S. S. Co., Mills Building, 23 Broad St., New York City:*

Storm has not moved since morning. High northeasterly winds to the Capes of the Delaware, and thirty to thirty-five miles per hour from the northeast from there south.

GREELY,
Chief Signal Officer.

[Telegram.]

NEW YORK, *September* 12, 1889—6.13 p. m.

GENERAL GREELY, *U. S. Signal Service, Washington, D. C.:*

Many thanks for your most valuable information and aid to commerce. I have again postponed sailing "Advance" till ten a. m. to-morrow. Nearly all ships that sailed since last Monday are at anchor in lower bay; some have returned after having been outside. Our ship is lying securely fast at dock.

J. M. LACHLAN,
General Manager U. S. & B. M. S. S. Co.

[Letter.]

OFFICE OF THE UNITED STATES & BRAZIL MAIL STEAMSHIP COMPANY,
NEW YORK, *September* 12, 1889.

GENERAL GREELY, *U. S. A., Chief Signal Officer, Washington, D. C.:*

DEAR SIR: On Tuesday, 10th, I wired you as per enclosed copies, which I now confirm, and here received the following replies from your office, copies herewith annexed. I wired your good self this p. m., copy herewith, which I also confirm.

I desire, on the part of this company, to sincerely thank you for the prompt and valuable information furnished in respect to the indications, and to state, so sure was the writer of the absolute certainty of your messages, that I had no hesitation whatever in postponing the steamship "Advance." A number of foreign and coasting steamships sailed from here, but it did not give us the slightest uneasiness as we were quite sure they could not go far. We now find that nearly all of these ships are at anchor in the lower bay, with two anchors down, rolling and tumbling about in the heavy swell down there. Our ship is lying secured, fast to her wharf, not burning coal, nor doing any damage. If any ship can go outside ours can, but is it prudent to do so when it can be avoided? On Saturday, the 7th, we received a cable from Saint Thomas, W. I., advising of arrival and sailing from thence, bound south. The cable further stated: "Hurricane, no damage."

There is no doubt but what this is the same cyclone on its way northward and I have no doubt also that you have observed the slowness of its speed in its track; however fast it may be revolving it seems to have a large area. Seeing the extraordinary high tides on Sunday a. m., and not seeing the ebb go down to its normal level put the writer on the *qui vive*, and he determined to consult your office before despatching the s. s. "Advance." No doubt we shall hear of numerous casualties shortly on this coast and off shore.

Again thanking you,

I am, yours truly,

J. M. LACHLAN,
Manager.

2.—This depression was central over mid-ocean north of the fiftieth parallel on the 1st, with central pressure about 29.70 (754) and moderate to fresh gales, after which it apparently moved northeastward beyond the region of observation.

3.—This depression apparently originated northeast of the Grand Banks, where it was central on the 2d with pressure about 29.50 (749). During the 3d and 4th the centre of depression moved slowly eastward to about the thirty-fourth meridian. From the 5th to the 13th, inclusive, this depression pursued a slow, irregular course over mid-ocean, its advance eastward being apparently obstructed by an area of high pressure that occupied the British Isles and the adjacent ocean. It will be noted that during this period the severe storm described as number 1 was advancing north-northwest from the West Indies, and that a depression was moving northeast and east between the West Indies and the Azores. It will also be observed that a ridge of high pressure appeared over the Canadian Maritime Provinces and extended thence southward over the ocean, and that a second area of high pressure occupied the extreme eastern part of the ocean. In the region dominated by depression number 3 the barometric pressure was reported below 29.00 (737), and gales attaining hurricane force were encountered on the 10th. After the 10th the depression appeared to lose energy, and by the 14th had apparently dissipated.

4.—The approximate path of this depression is given northeast of the Windward Islands on the 4th and 5th, after which its probable course northeastward to the thirty-fourth parallel by the 8th is indicated. From the 8th to the 11th the storm-centre moved north of east to the Azores with low pressure and disturbances of great violence, after which latter date it apparently passed northward and united with number 3.

5.—This was probably a subsidiary development to depression number 3, and on the 9th was central over mid-ocean south of the fiftieth parallel, with central pressure about 29.30 (744), and moderate to fresh gales, after which it moved northward and united with number 3.

6.—This depression was a continuation of low area vii, and on the 22d was central over the Gulf of Saint Lawrence, with pressure below 29.40 (747), and fresh to strong gales west of the fortieth meridian. On the morning of the 23d the storm was central over Newfoundland, where the pressure was below 29.40 (747), whence it moved northeastward and disappeared north of the region of observation after the 25th, without evidence of loss of energy.

7.—This depression was a continuation of low area viii, and on the 27th was central over the Gulf of Saint Lawrence, with pressure below 29.70 (754), whence it moved north of east over northern Newfoundland during the 28th, after which it disappeared north of the region of observation.

OCEAN ICE IN SEPTEMBER.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported for September, during the last seven years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
	° ′	° ′		° ′	° ′
September, 1883	48 25	47 10	September, 1883	49 01	44 33
September, 1884	46 06	53 21	September, 1884	47 39	49 14
September, 1885	45 40	48 22	September, 1885	48 40	46 27
September, 1886	46 40	53 00	September, 1886	48 00	43 40
September, 1887	45 37	40 50	September, 1887	45 37	40 50
September, 1888	Off Cape	Race.	September, 1888	53 00	52 08
September, 1889	46 21	48 22	September, 1889	48 59	46 48

In September, 1889, the southernmost ice reported, which consisted of a large and a small iceberg, observed on the 14th in the position given, was less than one-half degree south of the average southern limit, and the easternmost ice reported, a small iceberg observed on the 26th, was less than one-half degree east of the average eastern limit of ice for the month. Ice was most frequently encountered from the Straits of Belle Isle eastward to the fiftieth meridian, and on the northeast edge of the Banks of Newfoundland. No ice was reported near the east coast of Newfoundland south of Belle Isle. Compared with the corresponding month of previous years, there was about the usual distribution of Arctic ice for September, 1889, although the aggregate quantity reported was somewhat in excess of the average for the month.

The following positions of icebergs and field ice reported are shown on chart i by ruled shading:

1st.—N. 50° 40′, W. 50°, two large bergs; N. 50° 25′, W. 50° 20′, three bergs, one very small.

3d.—N. 50° 55′, W. 50° 57′, three bergs; N. 51° 50′, W. 55° 15′, small bergs.

4th.—N. 52° 49′, W. 51° 46′ to Belle Isle, a number of large bergs; N. 52° 21′, W. 51° 06′, small bergs.

5th.—N. 48° 45′, W. 49° 19′, two moderate sized bergs.

6th.—N. 52° 59′, W. 51° 35′, bergs of all sizes; N. 52° 50′, W. 52°, two large bergs, and from thence to Cape Norman, six bergs, mostly partly submerged and surrounded by small pieces.

6–8th.—N. 52° 59′, W. 51° 35′ to Straits of Belle Isle, bergs of all sizes four to five miles apart.

7–8th.—N. 53° 05′, W. 51° 27′, a large number of small bergs; off Belle Isle, several large bergs.

8th.—Off Belle Isle, several bergs, some rather large; in Straits of Belle Isle, bergs of all sizes; from Cape Norman to Belle Isle, bergs, many aground north side of straits.

9th.—N. 48°, W. 48° 40′, two bergs, one eighty the other one hundred and twenty feet high.

10th.—N. 47° 52′, W. 48° 38′, one berg; N. 47° 40′, W. 48°

40′, two large and three small bergs; N. 48° 09′, W. 48° 47′, two bergs.

11th.—N. 46° 54′, W. 48° 25′, a berg two hundred by eighty feet.

11–12th.—From N. 53° 13′, W. 50° 48′, to Point Amour, several very large and small bergs.

12th.—N. 53° 08′, W. 50° 50′, one small berg; N. 52° 36′, W. 53° 00′, two large bergs; N. 47° 52′, W. 48° 29′, a large square berg thirty to forty feet high; N. 47° 40′, W. 49° 07′, a small peaked berg.

13th.—N. 46° 40′, W. 47° 50′, two large and one small berg; N. 48° 07′, W. 49° 27′, a large and a small berg and large pieces; N. 47° 49′, W. 49° 58′, two large bergs; N. 47° 57′, W. 49° 11′, one medium-sized berg; N. 48° 00′, W. 49° 20′, two large bergs fifteen miles apart.

14th.—N. 46° 21′, W. 48° 22′, a large and a small berg; N. 48° 15′, W. 48° 55′, three bergs; N. 47° 35′, W. 49° 15′, three large bergs about one hundred and fifty feet high, irregular shape, peaked at ends.

15th.—N. 46° 40′, W. 47° 50′, two large and a small berg and several pieces of ice; N. 47° 28′, W. 49° 25′, bergs.

17th.—N. 46° 50′, W. 48° 12′, three very large and several small bergs at intervals of several miles.

19th.—N. 47° 29′, W. 51° 00′, a small berg.

21st.—N. 47° 40′, W. 50° 06′, a high berg with complete arch through the centre.

23d.—From Belle Isle to 50′ east, five moderate-sized bergs; N. 52° 15′, W. 53° 28′, two large bergs; three bergs near Belle Isle.

24th.—N. 48° 52′, W. 46° 56′, a small berg; from N. 48° 22′, W. 48° 27′, to N. 48° 01′, W. 49° 12′, three bergs and small pieces of ice.

25th.—N. 48° 03′, W. 48° 32′, a berg; N. 48° 26′, W. 48° 02′, two bergs and detached pieces.

26th.—N. 47° 41′, W. 48° 29′, a large berg; N. 48° 59′, W. 46° 48′, a small berg; N. 48° 32′, W. 47° 55′, very large bergs; N. 53° 00′, W. 52° 06′, two large bergs, and from this position to off Belle Isle on the 27th, a number of large bergs; from N. 52° 00′, W. 54° 55′, to N. 52° 09′, W. 54° 21′, four large bergs right in the track of vessels bound through the Straits of Belle Isle.

27th.—From ninety miles from Belle Isle to entrance of straits, several very large bergs.

28th.—N. 48° 30′, W. 46° 51′, a small berg.

29th.—N. 52° 22′, W. 53° 25′, two small bergs.

FOG IN SEPTEMBER.

The limits of fog-belts west of the fortieth meridian are shown on chart i by dotted shading. In the vicinity of the Banks of Newfoundland fog was reported on nineteen dates, as compared with twenty-two dates for August, 1889, and sixteen dates for September, 1888. Between the fifty-fifth and sixty-fifth meridians fog was reported for six dates, as compared with six dates for August, 1889, and twelve dates for September, 1888. West of the sixty-fifth meridian fog was reported on eight dates, as compared with nine dates for August, 1889, and eleven dates for September, 1888. Compared with the preceding month there has been a slight decrease in fog frequency over and near the Grand Banks, while to the west of the fifty-fifth meridian the aggregate number of days for which fog was reported was the same for each month. Fog was reported for seven dates along the steamship track north of Newfoundland. Fog was reported over and near the Grand Banks on the 1st, 15th, and 15th to 18th, and in the ice region north of Newfoundland on the 6th, 7th, and 8th, with variable winds and relatively high barometric pressure; on the remaining dates for which fog was reported in those regions the approach or passage of areas of low pressure was noted. Between the fifty-fifth and sixty-fifth meridians fog was reported on the 1st with northeasterly winds and high pressure, and from the 5th to the 9th, inclusive, within the area of high barometer and variable or easterly winds that occupied that region during the approach of the cyclone from the West Indies to the middle Atlantic coast. West of the sixty fifth meridian dense fog attended the approach of the West Indian hurricane from the 6th to the 9th; during the 14th, 15th, and 16th, fog was reported in that region with southeasterly winds and high pressure, and on the 26th, attending the advance off the middle Atlantic coast of an area of low pressure.

The following are limits of fog-areas on the north Atlantic Ocean during September, 1889, as reported by shipmasters:

Date.	Entered.		Cleared.		Date.	Entered.		Cleared.	
	Lat. N.	Lon. W.	Lat. N.	Lon. W.		Lat. N.	Lon. W.	Lat. N.	Lon. W.
	° ′	° ′	° ′	° ′		° ′	° ′	° ′	° ′
1	45 05	51 53	43 21	57 32	16–17	48 08	44 31	46 17	48 15
4	Saint Johns N. F.,		fog at sea.		17	46 50	46 40	46 27	48 00
4	47 30	45 40	46 01	49 21	17–18	48 34	41 50	45 34	49 53
4	48 28	43 11	48 07	44 10	18–19	44 23	48 37	43 31	52 56
4–5	46 13	45 46	45 00	50 08	18–19	46 45	45 30	44 28	52 20
5	42 23	61 24	42 19	61 45	19	Saint Johns, N. F.			
6	42 59	60 39	42 50	61 12	20	47 41	44 17	47 20	45 40
6–7	52 36	52 34	Cape Norman.		20–21	53 15	48 35	52 07	51 15
6–7	41 16	66 32	40 20	69 31	21	46 58	47 10	46 56	47 46
7	43 20	59 55	42 15	62 30	21	45 02	51 10	46 00	45 58
7–8	46 45	49 00	47 50	44 15	22	43 50	50 15	43 30	51 32
7–8	41 12	66 42	40 23	70 09	22	49 25	47 00	47 40	50 45
8	52 04	54 15	51 48	55 30	23	48 18	46 30	48 12	47 00
8	41 00	66 45	40 25	67 53	23–24	48 30	45 57	47 58	47 35
8–9	42 20	67 30	42 23	65 00	23	52 45	52 22	53 10	50 51
9	49 18	63 36	49 14	65 00	24	46 10	45 16	46 45	43 15
9	41 09	68 14	41 17	67 45	25	55 30	41 00	56 00	37 13
14–15	New York.		40 15	73 52	26	40 57	73 23	40 57	73 23
15	42 50	50 30	42 35	53 00	28–29	54 36	43 38	55 51	33 47
15–16	42 41	66 05	42 25	70 00	28–29	46 35	52 21	46 25	52 44
16	47 36	43 14	47 15	44 48					

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for September, 1889, is exhibited on chart ii by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperature and the departure from the normal are given for regular stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Signal Service represents the mean of the maximum and minimum temperatures.

In September, 1889, the mean temperature was highest in the extreme southeastern part of California and the adjoining part of Arizona, where it rose above 85°, the highest mean reading, 91°.3, being reported at Cactus, Cal. In southeastern California, south of the thirty-sixth parallel, southern Nevada, central and western Arizona, extreme southern Louisiana, central and southern Florida, and at one station each in south-central Alabama, and eastern Texas the mean values were above 80°. South of a line traced irregularly westward from North Carolina to southern New Mexico, in central Kansas, and in the Sacramento and San Joaquin valleys, Cal., the mean temperatnre was above 70°. Exclusive of Pike's Peak, Colo., where 31°.7 was reported, monthly mean temperature below 32° was not reported, and the only stations noting monthly mean values below 50° were located in central Colorado, south-central Oregon, central Montana, southeastern Idaho, central Utah, northwestern Wyoming, and in the British Possessions north of Dakota and Montana. At Mount Washington, N. H., and Mount Killington, Vt., the mean temperature was 43°.2 and 47°.6, respectively.

The mean temperature was below the normal, except at sta-

tions in the Saint Lawrence Valley, the Canadian Maritime Provinces, northern New England, northeastern New York, the north-central and northeastern parts of the upper lake region, at Jacksonville, Fla., in the southern plateau region, and along the Pacific coast south of the Columbia River. The greatest departures below the normal temperature were noted in north-central Texas and Indian Territory, where they exceeded 5°. At stations and in districts where the mean temperature was above the normal the departures were less than 4°. Considered by districts, the greatest average departure below the normal temperature, 5°.8, occurred on the southeastern slope of the Rocky Mountains; in the west Gulf states the average departure below the normal temperature was 3°.7; in the Rio Grande Valley, 3°.2; in the Ohio Valley and Tennessee, 3°.1; in the Missouri Valley, 2°.9; in the middle Atlantic states, 2°.6; in the upper Mississippi valley and middle plateau region, 2°.4; over the middle-eastern slope of the Rocky Mountains, 2°.2; in the east Gulf states and over the northeastern slope of the Rocky Mountains, 2°.0; and in the south Atlantic states, Florida peninsula, upper and lower lake region, extreme Northwest, northern plateau region, and north Pacific coast, less than 2°.0. The greatest average departure above the normal temperature, 3°.4, occurred on the south Pacific coast; on the middle Pacific coast the average departure above the normal was 2°.8, and in the southern plateau region 0°.2. In New England the mean temperature for the month averaged normal.

The following are some of the most marked departures from the normal at the older established Signal Service stations:

Above normal.	°	Below normal.	°
Sydney, C. B. I.	4.0	Abilene, Tex	6.2
San Francisco, Cal.	3.6	Fort Sill, Ind. Ter	5.4
Los Angeles, Cal.	3.6	Leavenworth, Kans.	4.3
Red Bluff, Cal.	3.0	Saint Louis, Mo.	4.0
Parry Sound, Ont.	2.0	Fort Custer, Mont	3.6

DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for September, 1889; (4) the departure of the current month from the normal; (5) and the extreme monthly means for Septemper, during the period of observation and the years of occurrence:

State and station.	County.	(1) Normal for the month of Sept.	(2) Length of record.	(3) Mean for Sept., 1889.	(4) Departure from normal.	(5) Extreme monthly mean temperature for Sept.			
						Highest.	Year.	Lowest.	Year.
Arkansas.		°	*Years*	°	°	°		°	
Lead Hill	Boone	71.0	8	68.2	−2.8	76.4	1884	67.5	1883
California.									
Sacramento	Sacramento	69.0	35	63.4	−5.6	76.0	1853	61.9	1864
Colorado.									
Fort Lyon	Bent	65.8	20	65.4	−0.4	72.0	1867	55.9	1868
Connecticut.									
Middletown	Middlesex	60.6	21	61.8	+1.2	63.8	1870	32.4	1871
Florida.									
Merritt's Island	Brevard	79.3	5	79.4	+0.1	80.0	1884	78.4	1888
Georgia.									
Forsyth	Monroe	76.5	15	75.8	−0.7	82.2	1884	72.8	1888
Illinois.									
Peoria	Peoria	67.0	33	64.9	−2.1	73.4	1865	60.2	1866
Riley	McHenry	60.8	23	59.3	−1.5	68.4	1865	56.4	1888
Indiana.									
Vevay	Switzerland	68.5	23	65.3	−3.2	76.3	1881	63.0	1869
Iowa.									
Cresco	Howard	58.8	16	57.7	−1.1	64.3	1877	54.3	1873
Monticello	Jones	61.4	35	61.1	−0.3	73.1	1865	51.0	1850
Logan	Harrison	65.2	15	62.2	−3.0	70.2	1886	61.3	1876
Kansas.									
Lawrence	Douglas	67.0	26	63.2	−3.8	71.2	1886	61.8	1868
Wellington	Sumner	69.1	10	66.5	−2.6	74.5	1884	63.8	1883
Louisiana.									
Grand Coteau	Saint Landry	78.0	6	76.4	−1.6	81.6	1884	75.3	1888
Maine.									
Gardiner	Kennebec	58.4	49	60.7	+2.3	64.3	1841	53.3	1845
Maryland.									
Cumberland	Allegany	62.0	30	64.0	+2.0	70.0	1881	55.7	1863

Deviations from normal temperatures—Continued.

State and station.	County.	(1) Normal for the month of Sept.	(2) Length of record.	(3) Mean for Sept., 1889.	(4) Departure from normal.	(5) Extreme monthly mean temperature for Sept.			
						Highest.	Year.	Lowest.	Year.
Massachusetts.		°	*Years*	°	°	°		°	
Amherst	Hampshire	60.2	53	61.0	+0.8	67.4	1881	50.9	1858
Newburyport	Essex	60.4	11	61.2	+0.8	64.4	1884	57.0	1888
Somerset	Bristol	64.3	17	65.8	+1.5	69.2	1881	61.6	1885
Michigan.									
Kalamazoo	Kalamazoo	61.9	13	62.4	+0.5	69.0	1881	55.2	1879
Thornville	Lapeer	62.0	12	62.6	+0.6	71.0	1881	57.8	1879
Minnesota.									
Minneapolis	Hennepin	58.2	24	58.2	0.0	67.7	1865	49.9	1868
Montana.									
Fort Shaw	Lewis a Clarke	56.0	21	55.2	−0.8	61.3	1867	43.2	1873
New Hampshire.									
Hanover	Grafton	56.9	53	58.7	+1.8	62.9	1881	50.3	1848
New Jersey.									
Moorestown	Burlington	65.3	26	63.7	−1.6	73.6	1881	60.6	1871
South Orange	Essex	63.5	19	62.8	−0.7	71.8	1881	53.0	1871
New York.									
Cooperstown	Otsego	55.3	35	58.7	+3.4	66.7	1881	53.3	1860, '63
Palermo	Oswego	58.9	29	60.1	+1.2	65.1	1881	54.5	1883
North Carolina.									
Lenoir	Caldwell	65.0	17	65.8	+0.8	71.1	1884	55.2	1878
Ohio.									
N'th Lewisburgh.	Champaign	64.3	57	64.3	0.0	73.0	1881	55.0	1835
Wauseon	Fulton	62.6	19	61.0	−1.6	71.1	1881	57.2	1883
Oregon.									
Albany	Linn	60.8	11	61.6	+0.8	64.7	1888	53.3	1884
Eola	Polk	59.5	19	61.2	+1.7	65.3	1876	51.2	1881
Pennsylvania.									
Dyberry	Wayne	58.1	22	57.2	−0.9	66.9	1881	52.5	1871
Grampian Hills	Clearfield	60.4	25	60.4	0.0	72.0	1881	54.2	1871
Wellsborough	Tioga	59.1	10	58.8	−0.3	73.8	1881	52.3	1883
South Carolina.									
Statesburgh	Sumter	70.4	8	70.9	+0.5	77.9	1881	69.9	1888
Tennessee.									
Austin	Wilson	72.0	18	69.7	−2.3	78.2	1881	67.6	1875
Milan	Gibson	70.0	6	67.4	−2.6	73.8	1884	66.6	1883
Texas.									
New Ulm	Austin	77.6	17	74.6	−3.0	81.0	1872	74.6	1889
Vermont.									
Strafford	Orange	59.6	16	61.1	+1.5	64.4	1879	56.2	1876
Virginia.									
Bird's Nest	Northampt'n	71.0	20	68.2	−2.8	79.1	1881	61.2	1877
Wisconsin.									
Madison	Dane	61.0	12	61.2	+0.2	65.3	1854	57.8	1888
Washington.									
Fort Townsend	Jefferson	57.5	14	55.5	−2.0	63.5	1874	53.9	1884

The above table shows that at New Ulm, Tex., with a record of seventeen years, the mean temperature for the current month was 1.0° below the lowest mean reported for the corresponding month of previous years, noted in 1876. Unusually high mean temperatures are not shown by this table.

MAXIMUM AND MINIMUM TEMPERATURES.

The highest temperature reported at regular stations of the Signal Service was noted in the Gila, lower Colorado, San Joaquin, and Sacramento valleys, where the absolute maximum temperature was above 100°, the highest reading, 109°, being registered at Fort McDowell, Ariz. At El Paso, Tex., the temperature rose to 100°. In South Carolina, Georgia, Florida, the Gulf states, except along the Texas coast, and from Manitoba southward to the Rio Grande Valley; in parts of the Ohio Valley and Tennessee, and the upper Mississippi valley, and in southern Michigan; over southern and western Arizona, southern Nevada, California, except along the coast north of San Francisco, and in southwestern Oregon, the maximum temperature at Signal Service stations was 90° or more. The lowest maximum temperature was reported in the extreme northwest part of Washington, where it fell to or below 70°. Along the coast of northern California, over the more northern part of the upper Lake region, and at stations on the New England coast the maximum temperature was below 80°. At the following named stations the highest absolute temperature noted for September during the respective periods of observation was reported: Moorhead, Minn., nine years record, 2° above maximum of 1885; Saint Vincent, Minn., ten years record, 5° above maximum of 1883; Denver, Colo., seventeen years record, 1° above maximum of 1878; Fort Thomas, Ariz., ten years record, 2° above maximum of 1883 and 1888; Fort Canby, Wash., seven years record, the same as maximum of 1883; Olympia, Wash., thirteen years

record, 2° above maximum of 1888; New Orleans, La., nineteen years record, the same as maximum of 1887; Eastport, Me., seventeen years record, the same as maximum of 1884. Reports of the older established Signal Service stations show that the highest temperature recorded for September was generally noted in New England, the middle Atlantic states, North Carolina, northern Louisiana, eastern Tennessee, Ohio Valley, lower lake region, upper Mississippi and Missouri valleys, and the middle, eastern, and southeastern slopes of the Rocky Mountains in 1881; in the east and middle Gulf states and western Tennessee in 1887; at Lake Superior stations in 1874; in extreme southern Texas in 1877; in Arizona and New Mexico in 1879 or 1883; and in the northern plateau region, the north Pacific coast, and northern California in 1888; elsewhere the periods of occurrence were irregular. The following are maximum readings in the several states and territories where maximum temperature of 100°, or over, was reported for for September, 1889, as shown by reports of United States Army post surgeons and state weather service and voluntary observers: Citronelle, Ala., 100°; Fort Mojave, Ariz., 113°; Mojave, Cal., 116°; Fort Lyon and Las Animas, Colo., 101°; Onida, Dak., 100°; Lake City, Fla., 102°; Andersonville, Quitman, and Smithville, Ga., 100°; Collyer, Fremont, and Oakley, Kans., 102°; Murray, Ky., 101°; Cameron, La., 110°; Louisville, Miss., 102°; Creighton, Nebr., 101°; El Dorado, Nev., 110°; Deming, N. Mex., 100°; Hartley, Tex., 102°; Saint George, Utah, 102°; and Wauzeka, Wis., 100°. Among high temperatures noted at Signal Service stations for September are: 100° at New Haven, Conn., 100° at Boston, Mass., 101° at Sandy Hook, N. J., 100° at New York City., 102° at Philadelphia, Pa., 101° at Baltimore, Md., 104° at Washington, D. C., 101° at Pittsburgh, Pa., 101° at Saint Louis, Mo., and 101° at North Platte, Nebr., all in 1881; 106° at Rio Grande City, Tex., in 1877; 100° at Fort Buford, Dak., and 101° at Leavenworth, Kans., in 1882; 107° at Fort Sully, Dak., in 1874; 102° at Fort Supply, Ind. T., in two or more years; 104° at El Paso, Tex., and 113° at Yuma, Ariz., in 1879; 112° at Fort McDowell, Ariz., in 1885; 114° at Phœnix, Ariz., in 1883; 100° at Boisé City, Idaho, and 102° at Ashland, Oregon, in 1888.

The lowest temperature reported at regular stations of the Signal Service, except at Mount Washington, N. H., Mount Killington, Vt., and Fort Klamath, Oregon, where 14°, 20°, and 16°, respectively, were recorded, was noted in central and northern Montana, where values falling below 25° were reported. The minimum temperature fell below 30° north of a line traced from central Minnesota to southeastern Montana, and thence southward to central New Mexico, whence it is continued northwest and west over the middle plateau region to east-central California, and from that region northeast and north to the British Possessions north of Washington Territory. Minimum temperature below 30° was also reported in northern New England and south-central Michigan. The reports of United States Army post surgeons and state weather service and voluntary observers show the following absolute minimum temperatures for states and territories where readings of 32° or below were reported: Williams, Ariz., 30°; Fort Gaston, Cal., 29°; Pike's Peak, Colo., 2°; Alma and Breckenridge, Colo., 8°; Dolly Varden Mines, Colo., 5°; Steele, Dak., 22°; Soda Springs, Idaho, 18°; Riley, Ill., 27°; Point Isabel, Ind., 30°; Fayette, Iowa, 23°; McAllister and Tribune, Kans., 28°; Calais and Mayfield, Me., 28°; Ludlow, Mass., 30°; Evart and Hart, Mich., 20°; Pokegama Falls, Minn., 21°; Frankford, Mo., 21°; Fort Logan, Mont., 16°; Fort Robinson and Hay Springs, Nebr., 24°; Elko, Nev., 13°; North Chesterfield, N. H., 25°; Fort Union, N. Mex., 24°; Angelica, N. Y., 30°; Findlay, Ohio, 30°; Beulah, Oregon, 24°; Wellsborough, Pa., 30°; Mount Pleasant and Nephi, Utah, 25°; Weathersfield Centre, Vt., 17°; Bolar and Lexington, Va., 32°; Fort Spokane, Wash., 25°; Clarkesburgh, W. Va., 30°; Neillsville, Wis., 22°, and Fort D. A. Russell, Wyo., 22°. At the following-named stations of the Signal Service the minimum temperature was as low or lower than previously recorded for September during the periods of observation: Pensacola, Fla., ten years record, the same as minimum of 1888; Galveston, Tex., nineteen years record, the same as minimum of 1887; Brownsville, Tex., fourteen years record, 1° below minimum of 1883; Chicago, Ill., eighteen years record, 1° below minimum of 1888; Davenport, Iowa, eighteen years record, 1° below minimum of 1888; Des Moines, Iowa, twelve years record, 1° below minimum of 1888; Dubuque, Iowa, seventeen years record, the same as minimum of 1888; Keokuk, Iowa, nineteen years record, 2° below minimum of 1888; Leavenworth, Kans., nineteen years record, 2° below minimum of 1876; Fort Assinniboine, Mont., ten years record, 3° below minimum of 1884; Fort Maginnis, Mont., eight years record, 2° below minimum of 1884; Helena, Mont., ten years record, 2° below minimum of 1882; Fort Supply, Ind T., seven years record, 3° below minimum of 1881; Fort Sill, Ind, T., thirteen years record, 6° below minimum of 1878; El Paso, Tex., twelve years record, the same as minimum of two or more years; Fort Apache, Ariz., eleven years record, the same as minimum of 1880 and 1882; Fort Grant, Ariz., twelve years record, 7° below minimum of 1881; San Carlos, Ariz., nine years record, the same as minimum of 1882 and 1887; Salt Lake City, Utah, sixteen years record, 1° below minimum of 1881; Boisé City, Idaho, thirteen years record, the same as minimum of 1886; Ashland, Oregon, six years record, the same as minimum of two or more years; Fort Klamath, Oregon, six years record, 1° below minimum of 1887; Spokane Falls, Wash., nine years record, 1° below minimum of 1884; Port Angeles, Wash., five years record, the same as minimum of 1887; Astoria, Oregon, five years record, 6° below minimum of 1886; Portland, Oregon, seventeen years record, 1° below minimum of two or more years; and Roseburgh, Oregon, twelve years record, the same as minimum of 1881. At a majority of stations in New England, the middle and south Atlantic states, the east and middle Gulf states, the Ohio valley and Tennessee, and the upper Mississippi valley the lowest September temperature for preceding years was noted in 1888; in Arkansas and northern Louisiana in 1881 or 1883; in northern Minnesota and northern Dakota in 1883; in Montana in 1884; and in northwestern Washington Territory in 1887; elsewhere the periods of occurrence were irregular. In September, 1889, the highest minimum temperature was noted at stations in southern Florida, where it was above 70°, and the minimum values were above 50° on the south Atlantic and Gulf coasts, in the Mississippi valley northward to Tennessee, and from southwestern Arizona northwest over western and central California to the Sacramento Valley.

LIMITS OF FREEZING WEATHER.

The southern and western limits of freezing weather are shown on chart ii by a line traced from extreme northeastern Minnesota irregularly southward to central Iowa, thence northwest to central Dakota, whence it is continued southward to central Kansas, southwest to east-central Arizona, northward to northern Utah, south-southwest to eastern California, northward to the Columbia Valley, where it curves eastward into Idaho, and thence to northwestern Washington Territory.

RANGES OF TEMPERATURE.

The greatest and least daily ranges of temperature at regular stations of the Signal Service are given in the table of miscellaneous meteorological data. The greatest monthly ranges occurred in eastern Washington Territory, Idaho, northern and eastern Montana, Dakota, western Nebraska, western Kansas, northwestern Indian Territory, Colorado, western New Mexico, western Minnesota, east-central Arizona, and within an area extending from southwestern Oregon over northeastern California and northwestern Nevada, where they were 60° or more, whence they generally decreased southward and toward the Atlantic and Pacific coasts. The least monthly ranges were noted over southern Florida, where they were less than 20°; they were less than 30° on the southeast New England and North Carolina coasts, and on the extreme north Pacific coast, and were less than 40° at a majority of stations on the Atlantic, Gulf, and Pacific coasts.

The following are some of the extreme monthly ranges:

Greatest.	°	Least.	°
Fort Klamath, Oregon	69.0	Key West, Fla	18.0
Bismarck, Dak	67.0	Block Island, R. I	25.0
Pueblo, Colo	66.0	Hatteras, N. C	26.0
Fort Assinniboine, Mont	65.0	Tatoosh Island, Wash	26.0
San Carlos, Ariz	62.0	Galveston, Tex	31.0
Carson City, Nev	60.0	San Diego, Cal	37.0

TEMPERATURE OF WATER.

The following table shows the maximum, minimum, and mean water temperature as observed at the harbors of the several stations; the monthly range of water temperature; and the mean temperature of the air for September, 1889:

Stations.	Temperature at bottom.				Mean temperature of air at the station.
	Max.	Min.	Range.	Monthly mean.	
	°	°	°	°	°
Boston, Mass	67.2	56.4	10.8	64.3	62.8
Canby, Fort, Wash	62.8	54.5	8.3	57.5	57.8
Cedar Keys, Fla	87.2	79.5	7.7	84.1	79.4
Charleston, S. C	82.8	74.8	8.0	79.9	75.8
Eastport, Me	53.7	51.5	2.2	52.4	58.0
Galveston, Tex	86.5	71.5	15.0	80.7	77.5
Key West, Fla	87.2	81.0	6.2	84.9	81.4
Nantucket, Mass	72.0	62.5	9.5	68.4	63.0
New York City	72.8	59.3	13.5	68.0	65.8
Portland, Oregon	68.8	61.5	7.3	64.7	61.4

FROST.

The following reports of frost injurious to vegetation have been received:

Hay Springs, Nebr.: the heavy frost on the 2d killed vines, etc., and that on the 5th and 6th was very damaging to the corn crop.—*Report of Mr. Wm. Waterman, voluntary observer.* Dodge Centre, Minn., 6th: a heavy frost occurred in the northern portion of this (Dodge) county last night, and caused considerable damage to the corn crop.—*New York Daily Tribune, September 7.* Neceda, Wis., 16th: a heavy frost occurred throughout the cranberry region last night, and as the crop was about half gathered the loss to the growers will be very heavy.—*The Evening Wisconsin, Milwaukee, Wis., September* 16. Sac City, Iowa: the frost on the mornings of the 17th, 18th, and 19th killed the corn blades and tender vegetation.—*Report of Dr. Caleb Brown, voluntary observer.* Dubuque, Iowa, 18th: a heavy frost was reported in this locality and along the line of the Illinois Central Railroad westward last night. It is stated that crops were greatly injured in many places.—*Evening Herald, Duluth, Minn., September* 18. East Tawas, Mich., 18th: a heavy frost occurred during the night, the first one of the season. Considerable damage was done to vines.—*Evening Herald, Duluth, Minn., September* 18. Green Bay, Wis., 18th: reports show that the cranberry crop has suffered considerable damage by frost; in some places the loss is estimated at 50 per cent.—*Report of T. F. Schley, observer, Signal Corps.* Milwaukee, Wis., 19th: the first frost of the season occurred this morning; no special damage was done in this section, but reports from the cranberry district show that considerable damage was done to the cranberry crop.—*Report of S. W. Rhode, observer, Signal Corps.* Lansing, Mich., 22d: the first frost of the season occurred last night, killing all vines and severely touching all corn still uncut.—*Report of N. B. Conger, observer, Signal Corps.* Mottville, Mich.: the frost on the morning of 22d injured corn and vegetation of all kinds.—*Report of Mr. J. A. Hartzler, voluntary observer.* Napoleon, Ohio: the heavy frost on the morning of the 22d killed all tender vegetation and damaged late corn.—*Report of Dr. T. C. Hunter, voluntary observer.* Westerville, Ohio: the frost on the morning of the 22d killed all tender vegetation in this section.—*Report of Mr. John Haywood, voluntary observer.* Ilion, N. Y.: the severe white frost on the 23d killed all garden vegetables.—*Report of Mr. G. A. Trowbridge, voluntary observer.* Canajoharie, N. Y., 23d: a heavy frost occurred in the Mohawk Valley this morning and caused great injury to gardens, vineyards, and buckwheat fields.—*The Oswego, N. Y., Palladium, September* 23. Fremont, Kans.: the frost on the 24th killed vines, plants, and tender vegetables.—*Report of Mr. Ed. Atkin, voluntary observer.* Port Huron, Mich., 27th: killing frost occurred during the night, injuring late corn to some extent.—*Report of H. L. Boyce, observer, Signal Corps.* Detroit, Mich., 27th: the first killing frost of the season occurred this morning; considerable damage was done to celery, tomatoes, and corn.—*Report of E. A. Evans, observer, Signal Corps.* Howe, Nebr.: severe frost occurred on the morning of the 27th, killing all garden vegetables.—*Report of Mr. George D. Carrington, voluntary observer.* Muscatine, Iowa: the frost on the 27th injured all tender vegetation.—*Report of Mr. J. P. Walton, voluntary observer.* Logan, Iowa: the frost on the 27th killed tender vegetables and flowers on low ground.—*Report of M. B. Stern, voluntary observer.*

The above reports show that damaging frost occurred in Nebraska on the 2d; in Minnesota on the 6th; in Wisconsin on the 16th; in Iowa on the 17th; in Iowa, Michigan, and Wisconsin on the 18th; in Iowa and Wisconsin on the 19th; in Michigan and Ohio on the 22d; in New York on the 23d; in Kansas on the 24th; and in Michigan, Nebraska, and Iowa on the 27th. Light frost was reported as far south as northern South Carolina, northern Georgia, northern Alabama, central Texas, southern New Mexico, east-central Arizona, central Nevada, and northern California. No frost injurious to vegetation was reported south of the fortieth parallel, save at Fremont, Kans., where it was noted on the 24th. Reports for preceding years show that the occurrence of killing frost for the current month was seasonable in the districts where it was reported, and that in September the first killing frosts of the season generally occur as far south as the Ohio Valley and the fortieth parallel, east of the Rocky Mountains. In August, 1889, reports of frost injurious to vegetation were received from Galena, Ill., 1st; Grand Rapids, Wis., 4–5th, and Linkville, Oregon, 19th, only.

Frost has been reported for September, 1889, as follows:

1st, Colo., Dak., Nebr., Nev., Oregon. 2d, Colo., Dak., Nebr., Nev., Oregon, Utah, Wyo. 3d, Colo., Nev., Oregon. 4th, Colo., Dak., Idaho, Kans., Mont., Nebr., Nev., Oregon, Utah, Wyo. 5th, Colo., Dak., Iowa, Kans., Minn., Mont., Nebr., Nev., N. Mex., Oregon, Utah, Wyo. 6th, Colo., Dak., Ill., Mo., Nebr., Nev., Oregon, Utah. 7th, Colo., Dak., Nebr., N. Mex., Ohio, Oregon. 8th, Cal., Colo., Nev., Oregon. 9th, Cal., Colo., Dak., Iowa, Nebr., Oregon, Utah. 10th, Cal., Colo., Nev., N. Mex., Oregon, Utah, Wash. 11th, Cal., Colo., Dak., Idaho, Mont., Nev., Oregon, Utah, Wash. 12th, Cal., Colo., Mich., Mont., Nev., Oregon, Utah, Wash. 13th, Ariz., Cal., Colo., Mont., Nev., Oregon, Utah, Wash. 14th, Ariz., Cal., Colo., Dak., Ind. T., Iowa, Mich., Mont., Nev., Oregon, Utah. 15th, Ariz., Colo., Dak., Iowa, Mich., Minn., Mo., Nebr., Nev., Oregon, Utah. 16th, Ariz., Colo., Ill., Iowa, Kans., Mich., Mo., Nebr., Nev., Oregon, Utah, Wis. 17th, Colo., Dak., Ill., Iowa, Ky., Mich., Minn., Mo., Nebr., Nev., Tenn., Utah, Wis. 18th, Colo., Dak., Ga., Ill., Ind., Iowa, Kans., Ky., Mich., Minn., Mo., Mont., Nebr., Nev., Ohio, Pa., Tenn., Utah, Wis. 19th, Ala., Colo., Ga., Ill., Ind., Iowa, Ky., Md., Mich., Minn., Mo., Nebr., Nev., N. Y., Ohio, S. C., Tenn., Wis. 20th, Ala., Colo., Ga., Ill., Iowa, Ky., Mich., Minn., Mo., Nebr., Nev., N. Y., N. C., Ohio, S. C., Tenn., Va., Wis. 21st, Colo., Dak., Ill., Ind., Iowa, Ky., Md., Mass., Mich., Minn., Nev., N. J., N. Y., N. C., Ohio, Tenn., Vt., W. Va., Wis. 22d, Colo., Ill., Ind., Iowa, Ky., Md., Mass., Mich., Nev., N. H., N. J., N. Y., N. C., Ohio, Pa., S. C., Tenn., Utah, Vt., Va., W. Va., Wis. 23d, Colo., Dak., Ill., Ind., Iowa, Me., Mass., Mich., Nev., N. H., N. J., N. Y., Ohio, Pa., R. I., Tenn., Utah, Vt., Va., W. Va. 24th, Ariz., Colo., Conn., Dak., Iowa, Kans., Mass., Mich., Nebr., Nev., N. Mex., N. Y., Ohio, Oregon, Utah, Vt., Wash., Wis. 25th, Ariz., Colo., Dak., Ind. T., Iowa, Kans., Ky., Mich., Mo., Nebr., Nev., Oregon, Utah, Wis. 26th, Ariz., Colo., Dak., Ill., Ind., Iowa, Kans.,

Ky., Mich., Minn., Mo., Nebr., Nev., N. Mex., Ohio, Tex., Utah, Wis. 27th, Colo., Ga., Ill., Ind., Iowa, Kans., Ky., Md., Mass., Minn., Mo., Mont., Nebr., Nev., N. Y., Ohio, Pa., Tenn., Utah, Va., W. Va., Wis. 28th, Ala., Ariz., Colo., Conn., D. C., Ga., Ill., Ind., Iowa, Ky., Md., Mass., Mich., Mo., Nev., Ohio, Pa., R. I., Tenn., Utah, Va., W. Va., Wis. 29th, Colo., Conn., Ky., Mass., Mich., Nev., N. H., N. Mex., N. Y., Pa., Utah, Vt., Wis. 30th, Colo., Nev., N. H., Tenn., Vt.

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for September, 1889, as determined from the reports of nearly 2,000 stations, is exhibited on chart iii. In the table of miscellaneous meteorological data the total precipitation and the departure from the normal are given for each Signal Service station. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

In September, 1889, the precipitation was greatest in areas in southern Florida, south-central Indian Territory and the adjoining part of north-central Texas, southeastern Kansas, central Kentucky, central New Jersey, southeastern Pennsylvania, eastern Texas, and central Virginia, where it exceeded ten inches, the greatest amount reported, 16.71 inches, being noted at Lehigh, Ind. T. At stations in western Arizona, a greater part of California, west-central Kansas, east-central Mississippi, western Nebraska, western Nevada, south-central Oregon, and northwestern Utah no rainfall was recorded. The following are the greatest and least rainfalls respectively reported in the several states and territories: Alabama, 9.23, at Decatur; 0.57, at Livingston. Arizona, 5.90, at Globe; 0.00, at western stations. Arkansas, 8.08, at Ozone; 0.21, at Pine Bluff. California, 1.52, at Crescent City; 0.00 at a majority of stations. Colorado, 1.48, at La Veta; 0.06, at Las Animas. Connecticut, 7.60, at Voluntown; 2.87, at Vernon Centre. Dakota, 6.25, at Alexandria; 0.37, at Onida and Rapid City. District of Columbia, 4.48, at Washington Barracks; 3.88, at Washington City. Florida, 13.87, at Key West; 0.95, at Micco. Georgia, 8.97, at Toccoa; 1.19, at Fort Gaines. Idaho, 1.06, at Soda Springs; trace, at Era. Illinois, 5.66, at Flora; 1.66, at Winnebago. Indiana, 8.90, at Huntingburgh; 1.39, at Point Isabel. Indian Territory, 16.71, at Lehigh; 1.97, at Fort Supply. Iowa, 7.19, at Washington; 0.70, at Wesley. Kansas, 10.59, at Sedan; 0.00, at several central stations. Kentucky, 12.40, at South Fork; 2.47, at Mount Sterling. Louisiana, 6.80, at Houma; 0.33, at Alexandria. Maine, 6.52, at Mayfield; 0.21, at Kennebec Arsenal. Maryland, 8.65, at Fallston; 3.79, at Barren Creek Springs. Massachusetts, 5.35, at Clinton; 2.20, at Provincetown. Michigan, 5.60, at Sault de Ste. Marie, 0.35, at Highland Station. Minnesota, 6.27, at Moorhead; 0.51, at Saint Paul. Mississippi, 6.60, at Holly Springs; 0.00, at Kosciusko. Missouri, 9.28, at Glasgow; 0.28, at Jerome. Montana. 2.95, at Glendive; 0.06, at Custer. Nebraska, 3.72, at Marquette; 0.00, at Fort Sydney. Nevada, 2.00, at Pioche; 0.00, at western stations. New Hampshire, 7.01, at Mount Washington, and 6.29, at Belmont; 2.92, at Pennichuck Station. New Jersey, 13.13, at Plainfield; 3.17, at Atlantic City. New Mexico, 3.93, at Hillsborough; 0.18, at Albuquerque. New York, 8.21, at Fort Schuyler; 1.82, at Alfred Centre. North Carolina, 5.30, at Lenoir; 0.35, at Grover. Ohio, 7.12, at Georgetown; 0.52, at Toledo. Oregon, 7.51, at Tillamook; 0.00, at south-central stations. Pennsylvania, 10.01, at Kennett Square; 1.88, at Mahoning. Rhode Island, 5.52, at Kingston; 3.41, at Block Island. South Carolina, 5.56, at Greenville; 1.46, at Florence. Tennessee, 9.91, at Clinton: 2.06, at Greeneville. Texas, 15.43, at Gainesville; 0.45, at Epworth and Panhandle. Utah, 1.26, at Saint George; 0.00, at extreme northwest stations. Vermont, 6.30, at East Berkshire; 3.05, at Jacksonville. Virginia, 10.69, at Lynchburgh; 3.07, at Woodstock. Washington Territory, 5.69, at Neah Bay; 0.26, at Fort Walla Walla. West Virginia, 5.94, at Harper's Ferry; 0.69, at Ella. Wisconsin, 4.79, at Fond du Lac; 0.25, at Honey Creek. Wyoming, 0.59, at Camp Sheridan; 0.00, at Fort Laramie.

The precipitation for September, 1889, was above the normal in the Saint Lawrence Valley, southern and western New England, the middle Atlantic states, Florida (south of the thirtieth parallel), northern Georgia, Alabama, extreme southern Louisiana, the Ohio valley and Tennessee, except at Memphis, Tenn., at eastern Lake Erie stations, from northern Minnesota and northeastern Dakota south-southwest over central Nebraska, at stations in central and extreme southeastern Arizona, and extreme western Texas, in west-central and southwestern Washington Territory, and at Los Angeles, Cal.; elsewhere the precipitation was below the average for the month. The most marked departures above the normal were reported in south-central Virginia and extreme southern Florida, where they exceeded seven inches. In the middle Saint Lawrence valley the rainfall exceeded the normal amount by more than five inches, while in extreme southeastern New York, southeastern Tennessee, and the upper valley of the Red River of the North the excess was more than four inches. The greatest departures below the normal precipitation occurred on the south Atlantic coast, in west-central Mississippi, and thence southwestward to the middle west Gulf coast, where they were more than three inches. In districts where the precipitation was in excess the average percentages of the normal were about as follows: New England, 117 per cent.; middle Atlantic states, 143 per cent.; Florida Peninsula, 170 per cent.; east Gulf states, 114 per cent.; west Gulf states, 109 per cent.; Ohio valley and Tennessee, 160 per cent.; extreme Northwest, 165 per cent.; Missouri Valley, 113 per cent.; southeastern slope of the Rocky Mountains, 108 per cent.; south Pacific coast, 567 per cent. In districts where the precipitation was deficient the average percentages of the normal were about as follows: south Atlantic states, 67 per cent.; Rio Grande Valley, 78 per cent.; lower lake region, 84 per cent.; upper lake region, 83 per cent.; upper Mississippi valley, 83 per cent.; northeastern slope of the Rocky Mountains, 75 per cent.; middle eastern slope of the Rocky Mountains, 80 per cent; southern plateau, 93 per cent.; middle plateau, 58 per cent.; northern plateau, 14 per cent.; north Pacific coast, 93 per cent., and middle Pacific coast, 1 per cent. The remarkable percentage of the normal rainfall noted on the south Pacific coast for the current month was due to a monthly rainfall of 0.34 inch at Los Angeles, Cal., where the normal precipitation for September is but .03 inch, and the very low percentage of the normal on the middle Pacific coast was occasioned by an entire absence of measurable rainfall during the month at the stations for which the normal precipitation has been determined.

In the following-named districts the rainfall for August, 1889, was excessive, while for the current month it was deficient: Rio Grande Valley, middle eastern slope of the Rocky Mountains, and the north and middle Pacific coasts. In New England, the middle Atlantic states, the east and west Gulf states, Ohio valley and Tennessee, extreme Northwest, southeastern slope of the Rocky Mountains, and the south Pacific coast there was a deficiency in August and an excess of rainfall in September, 1889. In the Florida peninsula there was an excess for the current and the preceding month, while in the south Atlantic states, the Lake regions, upper Mississippi valley, northeastern slope of the Rocky Mountains, and the

plateau regions there was a deficiency in August, 1889, and in the current month.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for September for a series of years; (2) the length of record during which the observations have been taken and from which the average has been computed; (3) the total precipitation for September, 1889; (4) the departure of the current month from the average; (5) and the extreme monthly precipitation for September during the period of observation and the years of occurrence:

State and station.	County.	(1) Average for the month of Sept.	(2) Length of record.	(3) Total for Sept., 1889.	(4) Departure from average.	(5) Extreme monthly precipitation for September.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
Arkansas.		*Inches*	*Years*	*Inches*	*Inches.*	*Inches*		*Inches.*	
Lead Hill	Boone	4.11	8	4.33	+0.22	8.44	1886	0.48	1888
California.									
Sacramento	Sacramento	0.12	40	0.00	−0.12	1.00	1851	0.00	*
Colorado.									
Fort Lyon	Bent	0.99	20	0.09	−0.90	4.72	1870	0.04	'67,'88
Connecticut.									
Middletown	Middlesex	3.34	31	4.72	+1.38	11.64	1882	0.49	1881
Florida.									
Merritt's Island	Brevard	8.42	11	3.83	−4.59	23.78	1878	2.88	1883
Georgia.									
Forsyth	Monroe	3.47	15	3.70	+0.23	8.69	1888	0.10	1886
Illinois.									
Peoria	Peoria	3.54	33	2.61	−0.93	9.63	1875	0.60	1867
Riley	McHenry	3.74	38	1.68	−2.06	8.89	1872	0.21	1877
Indiana.									
Logansport	Cass	3.50	13	3.13	−0.37	6.66	1859	0.24	1882
Vevay	Switzerland	3.38	24	5.19	+1.81	15.25	1860	0.47	1871
Iowa.									
Cresco	Howard	4.24	16	2.87	−1.37	10.03	1881	0.82	1888
Monticello	Jones	4.08	34	2.62	−1.46	10.15	1881	0.00	1871
Logan	Harrison	3.61	23	1.32	−2.29	9.90	1870	0.20	1882
Kansas.									
Lawrence	Douglas	3.29	24	5.02	+1.73	9.15	1884	0.23	1888
Wellington	Sumner	3.80	10	3.77	−0.03	11.19	1881	1.10	1884
Louisiana.									
Grand Coteau	St. Landry	3.86	6	2.13	−1.73	10.58	1885	0.37	1888
Maine.									
Gardiner	Kennebec	3.18	49	2.55	−0.63	8.24	1868	0.84	1865
Maryland.									
Cumberland	Allegany	2.68	18	4.16	+1.48	8.50	1882	0.40	1873
Massachusetts.									
Amherst	Hampshire	3.37	54	4.26	+0.89	11.85	1882	0.37	1865
Newburyport	Essex	3.23	10	2.83	−0.40	8.47	1888	0.87	1884
Somerset	Bristol	2.89	17	3.74	+0.85	7.27	1888	0.94	1884
Michigan.									
Kalamazoo	Kalamazoo	3.38	13	1.90	−1.48	6.28	1879	0.53	1882
Thornville	Lapeer	2.95	12	1.56	−1.39	5.25	1879	0.95	1882
Minnesota.									
Minneapolis	Hennepin	3.70	23	0.82	−2.88	11.45	1869	0.15	1882
Montana.									
Fort Shaw	Lewis&Clarke	0.83	20	0.35	−0.48	4.79	1882	0.00	'75,'79
New Hampshire.									
Hanover	Grafton	2.98	48	3.52	+0.54	7.03	1840	0.27	1884
New Jersey.									
Moorestown	Burlington	3.73	26	6.10	+2.37	11.71	1882	0.16	1884
South Orange	Essex	3.68	19	12.39	+8.71	14.45	1882	0.15	1884
New York.									
Cooperstown	Otsego	3.23	35	3.87	+0.64	5.79	1876	1.17	1871
Palermo	Oswego	3.20	35	2.70	−0.50	7.30	1866	1.04	1880
North Carolina.									
Lenoir	Caldwell	3.94	17	5.30	+1.36	8.50	1878	0.46	1871
Ohio.									
N. Lewisburgh	Champaign	3.15	17	3.75	+0.60	7.60	1884	0.75	1872
Wauseon	Fulton	2.38	17	0.79	−1.59	5.29	1879	0.35	1871
Oregon.									
Albany	Linn	1.89	11	1.74	−0.15	5.61	1884	0.41	1882
Eola	Polk	1.62	19	1.80	+0.18	6.57	1884	0.00	1873
Pennsylvania.									
Dyberry	Wayne	2.71	20	4.18	+1.47	6.49	1888	1.04	1885
Grampian Hills	Clearfield	3.28	18	2.76	−0.52	6.36	1868	1.14	1885
Wellsborough	Tioga	3.55	10	2.71	−0.84	8.40	1880	1.75	1888
South Carolina.									
Statesburgh	Sumter	3.66	8	3.23	−0.43	6.67	1884	0.75	1887
Tennessee.									
Austin	Wilson	3.77	19	3.59	−0.18	10.20	1868	1.51	1884
Milan	Gibson	2.76	7	4.85	+2.09	4.95	1884	0.64	1888
Texas.									
New Ulm	Austin	5.46	17	4.35	−1.11	15.08	1874	0.90	1872
Vermont.									
Strafford	Orange	3.58	16	5.00	+1.42	6.30	1880	0.70	1884
Virginia.									
Bird's Nest	Northampton	3.20	20	6.70	+3.50	7.70	1876	0.00	1884
Wytheville	Wythe	3.84	24	3.35	−0.49	12.20	1888	0.30	1862
Wisconsin.									
Madison	Dane	3.41	19	1.93	−1.48	8.17	1881	0.47	1871
Washington.									
Fort Townsend	Jefferson	1.35	14	0.75	−0.60	5.79	1874	0.16	1882

*Frequently.

Table of excessive precipitation, September, 1889.

State and station.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Alabama.	*Inches.*	*Inches.*		*Inches*	*h. m.*	
Auburn		2.70	23			
Citronelle		4.05	22			
Columbiana		3.12	23			
Decatur (1)		2.61	4			
Do		2.80	5			
Decatur (2)		3.30	3			
Evergreen		2.80	23			
Mobile		2.72	22-23			
Montgomery		3.17	23	1.78	1 00	23
Mount Vernon Barracks		4.10	22-23			
Mount Willing		2.60	23			
Selma (2)		3.00	23			
Valley Head		2.60	23			
Wiggins		2.97	23			
Arizona.						
Globe		2.97	7	2.97	2 55	7
Whipple Barracks (Prescott)				1.16	0 30	6
Arkansas.						
Fort Smith		2.68	4-5			
Fulton		2.57	8			
Connecticut.						
Voluntown		2.54	13			
Dakota.						
Alexandria		3.00	13			
Canton		4.22	13-14			
Davenport		2.55	13			
Webster		3.49	13-14			
Florida.						
Alva	10.51	2.68	17			
Altamonte Springs		3.72	18			
Fort Barrancas		3.78	22-23			
Homeland		3.50	25	3.50	3 00	25
Jacksonville		4.39	23	3.25	1 10	23
Key West	13.87	7.90	21-22			
Lake City		3.00	6			
Do		4.22	23			
Live Oak		4.50	23			
Villa City		4.00	18			
Georgia.						
Atlanta		3.43	23-24			
Athens (1)		2.80	23			
Columbus		3.50	23			
Forsyth		2.50	23			
Fort McPherson		4.00	23			
Gainesville		2.70	24			
Marietta		3.93	23			
Milledgeville				2.02	2 00	23
Point Peter		2.80	23			
Savannah				1.10	0 42	1
Do				1.10	0 45	6
Toccoa		3.00	17			
Do		2.68	24			
Illinois.						
Aurora		3.51	4-5			
Beason		3.00	5			
Lanark		3.08	4			
Louisville		3.40	4			
Oswego		2.71	4			
Pana		3.00	4-5			
Indiana.						
Evansville		2.65	5			
Huntingburgh		5.00	4			
Princeton		3.30	4			
Rockville		2.50	4-5			
Scalesville		3.58	4			
Vincennes		3.06	4			
Indian Territory.						
Lehigh	16.71	3.29	9			
Do		3.31	10			
Do		5.05	11			
Iowa.						
Mount Pleasant		3.00	11-12			
Washington		4.91	11-12			
Kansas.						
Arlington		2.50	14			
Cold Water		3.00	14			
Emporia		4.05	8			
Independence		5.08	10-11			
Leavenworth				1.05	1 00	14
Marmaton		3.80	11			
Sedan	10.59	7.52	10-11			
Winfield		2.50	21			
Kentucky.						
Burnside		2.57	6			
Murray		3.31	2			
South Fork	12.40	2.90	5-6			
Do		7.50	17-18			
Louisiana.						
Edgard		3.20	25			
Houma		5.33	25	3.60	1 00	25
New Orleans				1.39	0 30	25
Minnesota.						
Duluth		2.94	13-14			
Moorhead		4.30	12-13			
Mississippi.						
Holly Springs		2.80	5			
Loch Leven		3.60	6			
Meridian		3.26	5	1.60	0 40	5
Do				1.60	1 00	5

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Missouri.	*Inches.*	*Inches.*		*Inches*	*h. m.*	
Frankford (1)		3.18	11-12			
Glasgow		2.56	2-3			
Do		2.91	12			
Grand Pass				1.95	1 00	2
Hermann		3.05	5			
Kansas City		2.81	11			
Saint Louis				1.00	1 00	4
Shelbina		2.50	11			
Warrensburgh		2.70	10			
Nebraska.						
Creighton		2.85	13-14			
North Platte				1.25	1 10	21
New Jersey.						
Egg Harbor City	10.73	2.86	12			
Freehold	10.63	4.06	12			
Gillette		3.65	17-18			
Hopewell	10.90	3.20	14			
Imlaystown	11.29	2.97	13			
Lambertville	10.84	3.18	15	3.18	2 00	15
Newark		3.01	17			
Plainfield	13.13	3.70	17			
Tenafly	11.31					
Trenton	10.13	2.57	13			
New York.						
Boyd's Corners		2.57	17-18			
Fort Schuyler		2.70	12			
Nineveh		3.75	16-18			
Setauket		3.42	12			
South Kortright		3.18	22			
Tannersville		2.75	11			
West Point				1.50	1 15	6
North Carolina.						
Hatteras		3.59	18	1.08	0 34	18
Ohio.						
Oberlin		3.42	15-16			
Oregon.						
Tillamook		2.56	30			
Pennsylvania.						
Coatesville		3.13	17			
Doylestown		3.00	18			
Drifton		3.42	14			
Kennett Square	10.01					
Lancaster		2.68	16-17			
Lansdale		2.90	18			
Pottstown		3.40	17	3.40	2 30	17
Quakertown		3.40	17			
Seisholtzville		2.74	18			
South Carolina.						
Conway		3.85	23-24			
Greenville		2.50	24			
Hardeeville		2.55	1			
Port Royal		2.55	1			
Statesburgh		2.74	23-24			
Tennessee.						
Andersonville		4.58	16			
Bolivar		2.80	2			
Do		2.50	5			
Charleston		3.34	6			
Chattanooga		2.87	5			
Clinton		3.55	16			
Dunlap		3.21	17			
Dyersburgh		2.84	5			
Grand Junction		4.46	5			
Grief		4.00	5			
Hohenwald		2.62	17			
Johnsonville		2.50	5			
Kingston		2.55	7			
Kingston Springs		3.75	16			
Do		2.56	5			
Knoxville		2.77	16-17			
Loudon		4.20	16			
McKenzie		3.00	4			
Nunnelly		4.20	5			
Rockwood		2.75	17			
Rugby		3.31	17			
Springdale		3.05	17			
Trenton		3.44	5			
Texas.						
Austin		2.75	3			
Brazoria		3.70	2-3			
Do		2.79	4			
Brownsville		5.15	2	1.49	1 00	2
College Station	14.86	7.84	4			
Corpus Christi	12.69	3.20	2-3			
Do		3.72	27-28			
Cuero		3.00	3			
Decatur		4.13	9-10			
Forestburgh	12.25	5.19	8	5.19	3 50	8
Fort Brown		4.80	2			
Fort Elliott				1.42	1 00	14
Fort McIntosh		3.65	5-6	2.20	2 00	25
Gainesville	15.43	5.00	4-5			
Do		2.50	8			
Do		5.50	9-10			
Gallinas		3.41	3			
Graham	10.74	2.65	9			
Granbury		2.87	9			
Howe	10.05	4.15	10	3.00	0 20	10
La Grange		3.04	3			
Luling		3.35	3			

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Texas—Continued.	*Inches.*	*Inches.*		*Inches*	*h. m.*	
New Braunfels		2.65	3			
Do		3.90	15			
Paris		3.50	4			
Snyder		3.40	9			
Virginia.						
Bolar		3.30	6-7			
Do		4.20	23-24			
Lynchburgh	10.69	3.75	14-15			
Do		2.89	24			
Petersburgh		2.95	24-25			
Washington.						
Blakely		2.80	30			
Wisconsin.						
Fond du Lac		3.48	4			
Green Bay		3.30	4			
La Crosse				1.09	0 42	23
Mexico.						
Guanajuato	11.88	2.52	24			
La Logia		4.42	1	4.42	2 00	1
Do		3.25	16	3.25	3 00	16
Leon de Aldemas	12.94					
Topolobampo	10.31	3.74	1			
Do		4.43	15-16			

Excessive precipitation for August, 1889, received too late for publication.

Pennsylvania.						
Catawissa		2.75	14			
Drifton		3.42	14			
Doylestown		2.56	14			
Frederick		2.67	14			
Girardville		4.03	14			
Point Pleasant		2.53	14			
Pottstown		2.50	14			
Smith's Corner		2.64	14			

EXCESSIVE PRECIPITATION.

Monthly precipitation to equal or exceed ten inches was reported at six stations in Texas; at two stations in Florida, and at one station each in Kansas, Indian Territory, and Kentucky. In states and territories other than those named precipitation to equal or exceed ten inches was not reported for September, 1889. The heaviest rainfall in the states named was 15.43 at Gainesville, Tex.; 13.87 at Key West, Fla.; 10.59 at Sedan, Kans.; 16.71 at Lehigh, Ind. T., and 12.40 at South Fork, Ky. In September of preceding years rainfall to equal or exceed ten inches has occurred most frequently in Florida, where it was reported for twenty-nine years; in Texas for fifteen years; in North Carolina for eleven years; in Alabama, Georgia, Illinois, Indiana, Iowa, Kansas, Louisiana, Maryland, Massachusetts, Mississippi, Nebraska, New Hampshire, New Jersey, New York, Pennsylvania, South Carolina, and Virginia for from five to ten years, inclusive; and in Arizona, Connecticut, Delaware, District of Columbia, Kentucky, Michigan, Minnesota, Missouri, Ohio, Oregon, Tennessee, Vermont, Washington Territory, and Wisconsin for from one to four years, inclusive. In states and territories other than those named monthly precipitation to equal or exceed ten inches has not been reported for September in preceding years. Among the heavier rainfalls recorded for September are: 23.78, at Merritt's Island, Fla.; 25.10, at Biscayne, Fla., and 21.12, at Jacksonville, Fla., in 1878; 22.10, at Fort Myers, Fla., in 1854; 23.90, at Saint Augustine, Fla., in 1871; 23.24, at Mayport, Fla., in 1885; 22.08, at Brunswick, Ga., and 27.41, at Saint Mary's, Ga., in 1885; 25.98, at Paterson, N. J., in 1882; 21.97, at Sing Sing, N. Y., in 1868; 26.50, at Elsworth, N. C., in 1881; 20.10, at Wilmington, N. C., in 1877; 20.44, at Spartanburgh, S. C., in 1888; 30.57, at Brownsville, Tex., in 1886, and 26.01, at Galveston, Tex., in 1885. Exclusive of the instances and years cited, monthly rainfall to equal or exceed 15.00 inches has been reported for September for four years in Texas; for three years in Louisiana; for two years in Indiana, New Hampshire, and North Carolina, and for one year in Delaware, Florida, Georgia, Iowa, Minnesota, New York, Ohio, Oregon, South Carolina, and Virginia.

Precipitation to equal or exceed 2.50 inches in twenty-four hours was reported at the greatest number of stations, twenty-one, in Tennessee; at twenty in Texas; at twelve in Alabama; at nine in Florida, Georgia, and New Jersey; at eight in Pennsylvania; at seven in Kansas; at six in Illinois, Indiana, Missouri, and New York; at five in South Carolina; at four in Dakota; at three in Kentucky, Mississippi, and Virginia; at two in Arkansas, Iowa, Louisiana, Minnesota, and Wisconsin; and at one each in Arizona, Connecticut, Indian Territory, Nebraska, North Carolina, Ohio, Oregon, and Washington Territory. In states and territories other than those named precipitation to equal or exceed 2.50 inches in twenty-four hours was not reported for September, 1889. Among the heavier rainfalls reported for this period for the month were: 7.90, at Key West, Fla., 21st–22d; 5.00, at Huntingburgh, Tex., 4th; 5.05, at Lehigh, Ind. T., 11th; 7.52, at Sedan, Kans., 10–11th; 7.50, at South Fork, Ky., 17–18th; 5.33, at Houma, La., 25th, and 7.84, at College Station, Tex., 4th.

Rainfall to equal or exceed 2.50 inches in twenty-four hours in September has been most frequently reported in Texas, where it has been noted for eighteen years; in North Carolina for seventeen years; in Florida for fourteen years; in Georgia, Kansas, Mississippi, and South Carolina for thirteen years; in Missouri for twelve years; in Illinois, Iowa, Michigan, and Ohio for eleven years; in Alabama, Arkansas, Connecticut, Dakota, Kentucky, Louisiana, Maryland, Minnesota, Nebraska, New Jersey, New York, Pennsylvania, Tennessee, Virginia, and Wisconsin for from five to ten years, inclusive; and in Arizona, California, Colorado, Delaware, District of Columbia, Indiana, Indian Territory, Maine, Massachusetts, Montana, New Hampshire, New Mexico, Oregon, Rhode Island, Vermont, and West Virginia for from one to four years, inclusive. In states and territories other than those named rainfall to equal or exceed 2.50 inches in twenty-four hours has not been reported for September in preceding years. Among the heavier daily rainfalls reported for September are: 7.00, Mobile, Ala., 18th, 1877; 9.52, Mayport, Fla., 21st, 1885; 9.09, Merritt's Island, Fla., 9th, 1878; 7.04, Merritt's Island, Fla., 10th, 1878; 7.82, Jesup, Ga., 27th, 1885; 8.22, Nashua, Iowa, 25th, 1880; 7.00, Fort Hays, Kans., 12th, 1871; 7.00, Shreveport, La., 17th, 1875; 10.60, Genoa, Nebr., 1st, 1887; 7.41, Mount Washington, N. H., 15th, 1880; 8.00, Lambertville, N. J., 2d, 1850; 7.50, South Orange, N. J., 23d, 1882; 7.00, Portsmouth, N. C., 12th, 1884; 7.30, Wilmington, N. C., 10th, 1880; 7.40, Abbeville, S. C., 10th, 1888; 8.35, Greenwood, S. C., 10th, 1888; 8.50, Brownsville, Tex., 21st, 1887; 7.02, Wytheville, Va., 12th, 1878. At Fort Delaware, Del., 10.70 inches fell on the 3d and 4th, 1868; at Paterson, N. J., 17.90 on the 21st and 22d, 1882; and at Elsworth, N. C., 13.00 on the 15th and 16th, 1881. Exclusive of the instances and years cited, daily rainfall to equal or exceed 5.00 inches has been reported in North Carolina and Texas for six years; in Florida and Georgia for four years; in Mississippi for two years; and in Alabama, Arkansas, Kansas, Louisiana, Massachusetts, Missouri, Ohio, Pennsylvania, and Wisconsin for one year.

Rainfall to equal or exceed one inch in one hour was reported on five dates in Texas; on three dates in Georgia; on two dates in Arizona, Florida, and Missouri; and on one date each in Alabama, Kansas, Louisiana, Mississippi, Nebraska, New Jersey, New York, North Carolina, Pennsylvania, and Wisconsin; in states and territories other than those named, rainfall to equal or exceed one inch in one hour was not reported for September, 1889. Among the heavier rainfalls reported for one hour or less were: 1.16 in thirty minutes, at Whipple Barracks (Prescott), Ariz., 6th; 3.25 in one hour and ten minutes, at Jacksonville, Fla., 23d; 3.60 in one hour, at Houma, La., 25th; 1.60 in forty minutes, at Meridian, Miss, 5th; and 3.00 in twenty minutes, at Howe, Tex., 10th. In September of preceding years rainfall to equal one inch per hour has been most frequently reported in Texas, where it has been noted for twelve years; in Florida, Georgia, Illinois, Kansas, Nebraska, and North Carolina for from five to ten years, inclusive; and in Alabama, Arizona, Arkansas, Dakota, District of Columbia, Indiana, Indian Territory, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, South Carolina, Tennessee, Vermont, Virginia, and West Virginia for from one to four years, inclusive. In states and territories other than those named, rainfall to equal one inch an hour has not been reported for September in preceding years. Among the heavier rainfalls reported for one hour or less in September are: for eight minutes, 0.45, at New York City, 21st, 1882. For eleven minutes, 1.05, at Alpena, Mich., 10th, 1884. For fifteen minutes, 1.00, at Omaha, Nebr., 28th, 1881. For twenty minutes, 1.07, at Fort Riley, Kans., 15th, 1870. For twenty-five minutes, 1.23, at Washington, D. C., 16th, 1888; 1.20 at Philadelphia, Pa., 21st, 1882; 1.27 at Indianola, Tex., 7th, 1880. For twenty-seven minutes, 1.45, at Cairo, Ill., 13th, 1871. For thirty minutes, 1.70, at Cedar Keys, Fla., 2d, 1888; 1.40, at Mount Sterling, Ill., 1st, 1886; 2.00 at Charleston, S. C., 13th, 1887. For thirty-three minutes, 1.50, at Jacksonville, Fla., 5th, 1873. For thirty-five minutes, 1.64, at Fort Barrancas, Fla., 23d, 1878; 1.93 at Rio Grande City, Tex., 26th, 1879. For forty-five minutes, 2.42, at Fort Davis, Tex., 9th, 1880. For one hour, 3.00, at Saint Louis, Mo., 19th, 1849.

MAXIMUM RAINFALLS IN ONE HOUR OR LESS.

The following table is a record of the heaviest rainfalls during September, 1889, for periods of five and ten minutes and one hour, as reported by regular stations of the Signal Service furnished with self-registering gauges:

Station.	Maximum fall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
	Inch.		*Inch.*		*Inch.*	
Boston, Mass	0.11	18	0.20	18	0.55	18
Cincinnati, Ohio	0.15	15	0.20	15	0.45	16
Chicago, Ill	0.13	4	0.25	4	0.50	4
Detroit, Mich	0.15	15	0.15	15	0.20	15
Dodge City, Kans	0.07	7	0.11	7	0.27	7, 13, 14
Jupiter, Fla	0.25	19	0.40	19	0.75	19
Marquette, Mich	0.07	23	0.10	23	0.35	23
New York City	0.23	17	0.30	17	0.35	12
Savannah, Ga	0.33	6	0.60	6	1.10	6
San Francisco, Cal	.....	.....	.....	.....	T.*	.....
Saint Louis, Mo	0.23	4	0.45	4	1.00	4
Washington City	0.09	17	0.10	16, 17	0.35	17

*Fog, total for month.

The table shows that the greatest rate per minute for a five minute period was .066 of an inch at Savannah, Ga., on the 6th. The rate per minute for this period at the other stations given was, .05 at Jupiter, Fla., on the 19th; .046 at New York City, 17th, and at Saint Louis, Mo., 4th; .03 at Cincinnati, Ohio, and Detroit, Mich., 15th; .026 at Chicago, Ill., on the 4th; .022 at Boston, Mass., on the 18th; .018 at Washington City, on the 17th; .014 at Dodge City, Kans., 7th, and at Marquette, Mich., 23d. The greatest rate per minute for a ten minute period was .06, at Savannah, Ga., on the 6th. At Saint Louis Mo., the rate per minute for this period was .045, on the 4th; at Jupiter, Fla., .04, on the 19th; at New York City, .03, on the 17th; at Chicago, Ill., .025, on the 4th; at Boston, Mass., .02, on the 18th; at Cincinnati, Ohio, .02 on the 15th; at Detroit, Mich., .015, on the 15th; at Dodge City, Kans., .011, on the 7th; at Marquette, Mich., .01, on the 23d, and at Washington City, .01, on the 16th and 17th. The only rainfalls to equal or exceed one inch an hour are 1.10, at Savannah, Ga., on the 6th, and 1.00, at Saint Louis, Mo., on the 4th.

SNOW (snowfall in inches and tenths).

Snow fell in measurable quantities as far south as extreme northern Texas, where three inches were reported at Folsom on the 23d. The greatest depth of snowfall for the month, 10.4 inches, was noted at Mount Washington, N. H., where snow fell on the 19th to 22d, 27th, 29th, and 30th. In central Colorada 9.1 inches fell at La Veta on the 24th; 4.00 inches at Palmer Lake on the 23d and 24th, and 2.8 inches at Lead-

ville (no date given); elsewhere the snowfalls reported were less than one inch. The following is a record, by dates, of the occurrence of snow in the several states and territories: 12th: Saint Vincent, Minn., trace. 14th: Cheyenne, Wyo., 0.7, and Fort Laramie, Wyo., trace. 17th: Lansing, Mich., trace. 19th: Mount Washington, N. H., 4.6; Philipsburgh, Pa., trace; Mount Killington, Vt., trace. 20th: Mount Washington, N. H., 1.3. 21st: Mount Washington, N. H., 1.5; Mount Killington, Vt., trace; Blue Knob, Pa., 0.5; Virginia City, Mont., trace; Wausau, Wis., trace. 22d: Mount Washington, N. H., 0.5; Virginia City, Mont., trace. 23d: Colorado Springs, Colo., 0.1; Denver, Colo., trace; Coulter, Colo., 0.5. (14th and 23d); Cresco, Iowa, trace; Virginia City, Mont., trace; Folsom, Tex., 3.00. 23d–24th: Palmer Lake, Colo., 4.0; Taylor's Ranch, Utah, trace. 24th: La Veta, Colo., 9.1; Fort Logan, Mont., 0.5; Santa Fé, N. Mex., trace; Fort Washakie, Wyo., trace. 25th: Hayward, Wis., trace. 26th: Marquette, Mich., trace; Grand Meadow, Sheldon, and Saint Paul, Minn., trace; Viroqua, La Cross, and Grantsburgh, Wis., trace. 27th: Mount Washington, N. H., 0.5; Mount Killington, Vt., 0.5; Sault de Ste. Marie, Mich., trace. 28th: Mount Killington, Vt., trace. 29th: Mount Washington, N. H., 0.8; Constableville and Number Four, N. Y., trace. 30th: Mount Washington, N. H., 0.2.

The only report of unmelted snow on the ground at the end of the month was trace, at Mount Washington, N. H.

HAIL.

The more severe hail-storms of the month are noted under "Local storms." Hail was reported during the month as follows: 1st, Pa. 2d, Ariz. 3d, Mo. 4th, Dak., Wis. 6th, Ariz. 7th, Ariz., Kans. 9th, 11th, 12th, Dak. 14th, Colo. 15th, Dak., Ind., N. J., Utah. 16th, N. Y. 17th, Mich. 18th, Ariz., Dak., Ohio. 19th, N. Y., Pa. 20th, Ariz., Colo. 21st, Conn., Kans., Nebr., Pa., R. I. 22d, Dak. 23d, Utah, Wis. 24th, Kans., Pa. 25th, Ariz., Mich. 26th, Iowa, Mich., Minn. 27th, Mich., N. H., N. Y., Vt. 28th, Me., N. J., N. Y., Vt. 30th, Mich., N. J.

SLEET.

Sleet was reported as follows: 12th, Dak. 13th, Mont. 14th, Cal. 21st, Pa. 24th, Dak. 26th, Minn.

WINDS.

The prevailing winds during September, 1889 are shown on chart ii by arrows flying with the wind. In New England, and over the southern plateau region, south to west winds were most frequently noted, except on the south New England coast, where they were from north to east; in the middle and south Atlantic states, the east and west Gulf states, the Ohio valley and Tennessee, the upper Mississippi valley, the middle eastern slope of the Rocky Mountains, and on the north Pacific coast the winds were variable, except along the middle Atlantic coast, north to east; in North Carolina, northerly; along the west Gulf coast, southeast; in Tennessee, northeast to northwest; and in Illinois and Missouri, southeast to southwest; over the Florida Peninsula, northeast to east; in the Rio Grande valley southeast; in the lake regions, southeast to southwest; in the extreme Northwest, north to west; in the Missouri valley and the northeastern slope of the Rocky Mountains, northwest, except at the more southern stations in the Missouri valley, southerly; on the southeastern slope of the Rocky Mountains, south to southeast; over the northern and middle plateau region, west to southwest; on the middle Pacific coast, northwest to southwest; and on the south Pacific coast, west to northwest.

HIGH WINDS (in miles per hour).

Maximum velocities of fifty miles, or more, per hour, other than those given in the table of miscellaneous meteorological data, were reported as follows: Atlantic City, N. J., 54, ne., 11th; Block Island, R. I., 58, ne., 9th; 60, ne., 11th; 52, ne., 12th; Fort Assinniboine, Mont., 50, nw., 2d; Mount Washington, N. H., 98, nw., 21st; 93, nw., 23d; 92, nw., 24th.

LOCAL STORMS.

Exclusive of the storm along the Atlantic coast from the 8th to 12th, inclusive, descriptions of which are given under "North Atlantic storms," severe storms were reported in Texas on the 1st, 2d, and 3d; in Dakota, 3d and 4th; in Wisconsin, 4th; in Arizona, 6th and 7th; in Indian Territory, 8th to 12th; in Texas, 10th and 11th; in Kansas and Minnesota, 14th; in Virginia, 16th; in Delaware and Pennsylvania, 16th and 17th; in Maine, 19th; in Florida, 20th to 22d; in Florida and Georgia, 23d; and in New Jersey, 25th. Exclusive of the storm period, 8th to 12th, on the Atlantic coast, severe storms were most frequently reported in Texas and Indian Territory, where they were noted on five dates; in Florida on four dates; in Dakota, Arizona, and Delaware on two dates; and in Wisconsin, Virginia, New Jersey, Kansas, Minnesota, Maine, and Georgia on one date.

WATER-SPOUTS.

Rochester, N. Y., 19th: at about 8 a. m. several waterspouts were reported to have been observed at Ontario Beach, near Charlotte, N. Y. Dark, threatening clouds hung low, while loud peals of thunder and flashes of lightning were observed. From the water rose a mass of mist about forty feet in diameter, from the center of which extended a funnel-shaped column about five feet in diameter at the base, and spreading out to a width of eight or ten feet at the top, where it reached the clouds, seemingly about one hundred feet above the surface of the lake. There was an off-shore breeze at the time, and the column moved rapidly in a southeasterly direction. Soon another similar column rose in the west, and the first one diminished in size and disappeared. In the meantime a third one appeared, the second one growing larger, and a fourth appeared between the others. The spouts were visible about twenty minutes, and when departing, seemed to break in the center, the upper part disappearing in the clouds.—*Rochester, N. Y., Union, September* 19.

INLAND NAVIGATION.

HIGH TIDES.

Exclusive of the high tides attending the storm off the Atlantic coast from the 8th to the 12th, high tides were reported as follows: Wood's Holl, Mass., 8th; Key West, Fla., 8th, 9th, 10th; New London, Conn., 9th; Cedar Keys, Fla., 23d; Eastport, Me., 27th.

FLOODS.

Dallas, Tex., 11th: reports from the northern, northeastern, and northwestern sections of this state show that the rains which have fallen in those districts during the past week have caused general damage to crops and property, and delayed traffic by flood. There is scarcely a railroad that is not obstructed by bridges being washed away, and some points have been cut off from outer communication for forty-eight hours. The damage to the cotton crop will be very large.—*Republic, Saint Louis, Mo., September* 12.

STAGE OF WATER IN RIVERS AND HARBORS.

The following table shows the danger-points at the several

stations; the highest and lowest water for September, 1889, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, Sept., 1889, (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
Red River:						
Shreveport, La	29.9	30	18.8	4, 10	4.3	14.5
Arkansas River:						
Fort Smith, Ark	32.0	14	9.0	8	2.2	6.8
Little Rock, Ark	23.0	17	10.2	1	4.2	6.0
Missouri River:						
Fort Buford, Dak	.....	7	0.3	1	-1.0	1.3
Omaha, Nebr	18.0	1, 2	5.8	29, 30	5.1	0.7
Leavenw'rth, Kans.	20.0	1	7.0	30	4.8	2.2
Kansas City, Mo	21.0	17	7.7	30	4.5	3.2
Mississippi River:						
Saint Paul, Minn	14.5	1, 3	3.2	29, 30	1.9	1.3
La Crosse, Wis	24.0	2	4.4	30	2.4	2.0
Dubuque, Iowa	16.0	5	3.9	29	2.2	1.7
Davenport, Iowa	15.0	5, 6, 7	2.3	23 to 30	1.3	1.0
Keokuk, Iowa	14.0	14, 15	3.0	28	0.5	1.5
Saint Louis, Mo	32.0	17, 18	8.2	30	5.2	3.0
Cairo, Ill	40.0	10	14.4	4	7.1	7.3
Memphis, Tenn	34.0	12, 13	11.0	5	6.1	4.9
Vicksburg, Miss	41.0	18	11.7	10	6.8	4.9
New Orleans, La	13.0	19	5.7	11, 12, 13, 27	3.7	2.0
Ohio River:						
Pittsburgh, Pa	22.0	19, 24	6.3	2	0.2	6.3

Heights of rivers—Continued.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
Ohio River—Cont'd.						
Parkersburg, W. Va.	38.0	24	4.4	8	1.7	2.7
Cincinnati, Ohio	50.0	30	13.0	13	5.3	7.7
Louisville, Ky	25.0	30	5.8	15, 16	3.6	2.2
Cumberland River:						
Nashville, Tenn	40.0	21	13.0	1	3.0	10.0
Tennessee River:						
Chattanooga, Tenn	33.0	19	8.0	17	2.4	5.6
Monongahela River:						
Pittsburgh, Pa	29.0	19, 24	6.5	2	0.2	6.3
Savannah River:						
Augusta, Ga	32.0	25	19.3	17, 18, 19	6.8	12.5
Willamette River:						
Portland, Oregon	15.0	10	3.9	19	0.2	3.7

Mississippi River.—Saint Paul, Minn.: the steamer "Sidney" left this port for Saint Louis on the 26th. The water in the river is very low, and this is considered the last boat of the season.—*Report of P. F. Lyons, observer, Signal Corps.* Dubuque, Iowa., 29th: the water in the river is so low above this city that navigation will have to be suspended for the season.—*Report of S. C. Emery, observer, Signal Corps.*

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroras were observed during the month as follows: 3d, Blue Knob, Pa. 4th, Davenport, Iowa. 5th, Lyons, N. Y. 8th, Mount Washington, N. H. 10th, Webster, Dak. 18th, Leech Lake, Dak.; Saint Vincent, Minn. 21st, Carson, Iowa; Bernier Springs, Mich. 22d, Eastport, Me.; Lyons, N. Y.; Clarksburgh, W. Va. 23d, Nashua, N. H. 25th, Webster, Dak.; Manitowoc, Wis. 27th and 28th, Webster, Dak.

Mount Washington, N. H., 8th: the cloudy condition of the sky lifted at 9 p. m., disclosing an auroral arch, having altitude 18°, and azimuth about 75°. The aurora consisted of a band of greenish light about 2° in width, resting on a dark segment, which in turn rested on the horizon. The display ended 11.10 p. m.—*Report of J. W. Bauer, observer, Signal Corps.*

Saint Vincent, Minn.: an auroral arch was observed from 11 p. m. 18th to 5.20 a. m. the following day. The arch rose to altitude 10°, and extended from azimuth 135° to 215°. Its maximum brilliancy occurred at midnight.—*Report of R. J. Boylan, observer, Signal Corps.*

Eastport, Me., 22d: an auroral arch which rose to altitude 15°, and extended from north-northeast to north-northwest, was observed from 9.10 p. m. to 10.30 p. m.—*Report of D. C. Murphy, observer, Signal Corps.*

THUNDER-STORMS.

The more severe thunder-storms of the month are described under "Local storms." Thunder-storms were reported in the greatest number of states and territories, twenty-one, on the 3d, 4th, and 15th; in twenty on the 2d; in from fifteen to eighteen, inclusive, on the 1st, 5th, 14th, and 16th; in from ten to fourteen, inclusive, on 6th to 13th, 17th, 18th, 19th, 21st, to 25th; in seven on the 20th; and in from two to four, inclusive, on the 26th, 28th, 29th, and 30th. The 27th was the only date on which no thunder-storm was reported.

Thunder-storms were reported on the greatest number of dates, twenty-three, in Florida; on twenty-one in Texas; on nineteen in Dakota; on eighteen in Louisiana; on seventeen in Kansas; on from ten to fifteen, inclusive, in Arizona, Arkansas, Georgia, Illinois, Indian Territory, Iowa, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New York, Pennsylvania, and Tennessee; on from five to eight, inclusive, in Alabama, Indiana, Maryland, Massachusetts, New Jersey, North Carolina, Ohio, Virginia, and Wisconsin; on from one to four, inclusive, in California, Colorado, Connecticut, District of Columbia, Kentucky, Maine, Montana, Nevada, New Hampshire, New Mexico, Oregon, Rhode Island, South Carolina, Utah, Vermont, Washington Territory, and Wyoming. No thunder-storms were reported in Delaware, Idaho, and West Virginia.

MISCELLANEOUS PHENOMENA.

DROUGHT.

Dubuque, Iowa: the rain storm on the afternoon of the 4th broke the drought which has prevailed in this section since July.—*Report of S. C. Emery, observer, Signal Corps.*

Fort Sully, Dak., 9th: the corn crop in this section is completely parched by the continued dry weather.—*Report of S. G. Gardiner, observer, Signal Corps.*

Vanceborough, Me., 9th: the eastern part of this state is now passing through one of the most severe droughts known for years. The brooks have entirely run dry, while the lakes and rivers have become low. Forests and vegetation are parched and dry.—*Portland, Me., Press, September 10.*

Montgomery, Ala., 17th: the weather for some days has been very dry and hot. Through the country there is considerable complaint on account of the scarcity of water. The mills operated by steam and water power are unable to make full time for lack of water. The drought seems to be particularly severe in the country along the Western Railroad, as the passenger trains on the road have been delayed quite frequently, of late, because of the shortage in the water supply.—*The Daily Advertiser, Montgomery, Ala., September 17.*

Thornville, Mich., 30th: the drought which prevailed during the month of August has continued throughout this month. There has been some rain but not enough to make fall pasturage. Wells have failed more than in any previous year.—*Report of Mr. John S. Caulkins, voluntary observer.*

Birmingham, Mich.: the protracted drought still continues, retarding the growth of wheat.—*Report of Mr. S. Alexander, voluntary observer.*

Wauseon, Ohio, 30th: drought has prevailed during the entire month and farmers have not been able to sow wheat, the ground being too dry.—*Report of Mr. Thos. Mikesell, voluntary observer.*

FOREST FIRES.

Rapid City, Dak.: timber fires west of this place prevailed on the 9th, 10th, and 11th. The fires assumed large proportions and have done considerable injury. The rain on the 13th checked the progress of the fires.—*Report of Wm. Norrington, observer, Signal Corps.*

Detroit, Mich., 4th: a report from East Saginaw states that fires are raging in the pine forests, and that some of the lumber camps are in danger. About 1,000,000 feet of standing pine have been consumed. 9th: forest fires are reported in the upper peninsula, doing considerable damage to lumber and hay.—*Report of E. A. Evans, observer, Signal Corps.*

Port Huron, Mich., 9th: forest fires are raging north of the city, and considerable damage has been done to fences and outlying buildings. The fires are also destructive along the Flint and Pere Marquette Railroad.—*Report of H. L. Boyce, observer, Signal Corps.*

Breckenridge, Summit Co., Colo. 10th: severe forest fires have been raging in this county since yesterday. The entire town of Chihuahua, in the northeastern portion of this county, has been consumed by them. 16th: snow to the depth of over an inch has fallen, quenching the fires.—*Report of Dr. B. A. Arbogast, voluntary observer.*

Helena, Mont., 11th: extensive forest fires are reported in the vicinity of Georgetown, Deer Lodge Co. Hundreds of men are fighting the fires, but so far they have been unable to check the flames.—*Denver, Col., Times, September* 11.

Santa Ana, Cal., 26th: the fire which has been burning for the past two days still continues in the cañons. The burned and burning district now extends one hundred miles from north to south, and is from ten to eighteen miles in width. Over $1,000,000 worth of pasturage and timber has been destroyed. Santa Barbara, 26th: in the upper part of Santa Barbara county it is estimated that $200,000 worth of property, including timber and feed, has been destroyed during the past week.—*Los Angeles, Cal., Times, September* 27.

Red Bluff, Cal.: forest fires were reported in various parts of the surrounding country on nearly every day during the month.—*Report of John J. McLean, observer, Signal Corps.*

Walla Walla, Wash.: forest fires occurred near this place on the 2d, 5th, 6th, 11th, 19th, 20th, 25th, 26th.

PRAIRIE FIRES.

Rapid City, Dak.: owing to the dry condition of the grass, prairie fires in this section were both numerous and extensive on the 2d and 3d. Several barns, sheds, corrals, and hundreds of tons of hay have been burned near this city. The fires were only prevented from reaching the city by the united efforts of the citizens.—*Report of Wm. Norrington, observer, Signal Corps.*

Fort Buford, Dak.: Prairie fires started on the afternoon of the 8th on the southwest side of the Missouri River. The fires were extinguished during the night of the 8–9th.—*Report of A. Schneider, observer, Signal Corps.*

HALOS.

Solar halos were most frequently reported in Illinois, where they were noted on eleven days; in New York on ten; in Louisiana on seven; in New Jersey on six, and on from one to five, inclusive, in Alabama, California, Connecticut, Dakota, Indiana, Iowa, Kansas, Kentucky, Massachusetts, Michigan, Mississippi, Missouri, Nebraska, Nevada, New Hampshire, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Utah, and Virginia. In states and territories other than those named no solar halos were reported. They were reported in the greatest number of states and territories, eight, on the 23d; in seven on the 24th; in six on the 5th and 29th; and in from one to five, inclusive, from the 1st to 4th, 6th, 8th to 17th, 19th, 20th, 22d, 25th to 28th. No solar halos we reported on the 7th, 18th, 21st, 30th.

Lunar halos were most frequently reported in Tennessee and Texas, where they were noted on eight days; in New York on seven; in New Jersey on six; on from one to five, inclusive, in Arkansas, Connecticut, Dakota, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Michigan, Minnesota, Mississippi, Nebraska, Nevada, Ohio, Pennsylvania, South Carolina, Virginia, Washington Territory, and Wisconsin. In states and territories other than those named no lunar halos were reported. They were reported in the greatest number of states and territories, twelve, on the 10th; in nine on the 8th and 10th; in seven on the 4th; in six on the 1st and 5th; in from one to five, inclusive, on the 2d, 3d, 6th, 7th, 11th to 16th, 26th, 28th, and 29th. For dates other than those named no lunar halos were reported.

SUN SPOTS.

Mr. John W. James, Riley, Ill.: large spot on sun's meridian 1st, disappearing by the solar rotation 7th. 7th, four new spots, half the size of the large one, formed within twenty-two hours one day from the west edge, disappearing west edge, 8th, then none seen until the 23d, when the large spot reappeared on east edge, on sun's meridian, 29th, and on October 1st it had split into two spots. Mr. C. E. Buzzell, Leaf River, Ill.: the group of August 27th was central on September 2d, and disappeared late on the 7th; marked faculæ and changes in this group were noted on the 7th. A variable group first observed on the 27th, was central 29th, and was still seen on October 2d. Both September disturbances corresponded closely in time to group of August 1st, greatly diminished.

Mr. M. A. Veeder, Lyons, N. Y.: the large spot that came into view on August 26th completed its transit September 8th. On September 6th and 7th there was an outbreak of small spots in its vicinity, otherwise it underwent little change. On the 2d a group of faculæ appeared and persisted throughout the entire transit, being seen at the western limb on 15th. On the 5th, 8th, 11th, 12th, 15th, and 17th groups of faculæ appeared by rotation and remained visible for two or three days in each instance, not being seen subsequently. On the 23d a very large spot, with other smaller ones near by, was seen on the eastern limb. This spot continued with but slight changes of form until the end of the month. The smaller spots varied in number from day to day. Mr. H. D. Gowey, North Lewisburgh, Ohio: sun spots were observed on the 1st, 6th, 7th, and 27th.

Haverford College Observatory, Pa., (observed by Prof. F. P. Leavenworth):

Date.	Number of new—		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		Faculæ.		Remarks.
	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.	Groups.	Faculæ.	
Sept., 1889.											
9, 10 a. m.	0	0	0	0	0	0	0	0	.....	.....	Definition poor.
14, 10 a. m.	0	0	0	0	0	0	0	0	.....	.....	Definition fair.
16, 10 a. m.	0	0	0	0	0	0	0	0	.....	.....	Definition fair.
17, 10 a. m.	0	0	0	0	0	0	0	0	.....	.....	Definition poor.
18, 10 a. m.	0	0	0	0	0	0	0	0	.....	.....	Definition poor.
19, 9 a. m.	0	0	0	0	0	0	0	0	.....	.....	Definition poor.
21, 10 a. m.	0	0	0	0	0	0	0	0	.....	.....	Definition good.
22, 3 p. m.	0	0	0	0	0	0	0	0	.....	.....	Definition good.
23, 10 a. m.	1	6	0	0	1	6	1	6	.....	.....	Definition fair, 1 large spot.
26, 11 a. m.	0	0	0	0	0	0	1	6	.....	.....	Definition poor.
27, 9 a. m.	0	6	0	0	0	0	1	12	.....	.....	Definition fair.
28, 10 a. m.	0	3	0	0	0	0	1	15	.....	.....	Definition good.
29, 9 a. m.	0	0	0	0	0	0	1	7	.....	.....	Definition good.
30, 10 a. m.	0	0	0	0	0	0	1	6	.....	.....	Definition poor, large spot breaking up.

METEORS.

The distribution of meteors, by dates, was as follows: 2d,

Whipple Barracks (Prescott), Ariz. 5th, Greeneville, Tenn. 7th, Thornville, Mich. 9th, Lansing, Mich. 11th, Villa City, Fla. 12th, Nashville, Tenn. 13th, Villa City, Fla.; Rugby, Tenn. 14th, East Portland, Oregon. 15th, Rugby, Tenn.; Vashon, Wash. 18th, New Providence, Ind. 19th, Belle Plaine, Iowa. 21st, Rugby, Tenn. 22d, North Sutton, N. H.; Riddleton and Rugby, Tenn.; Weatherfield Centre, Vt. 23d, Berkeley and Hydesville, Cal. 24th, Greensborough, Ala.; Berkeley and Hydesville, Cal.; Lexington, Ky.; Princeton, Mo.; Riddleton, Tenn. 25th, Chattanooga, Tenn. 27th, New Providence, Ind. 28th, Kalamazoo, Mich.; Egg Harbor City and Beverly, N. J. 29th, Mansfield, Mass.; Las Vegas, N. Mex.

Chattanooga, Tenn., 25th: a meteor was observed at 9.35 p. m., about 30° east of the zenith, and moving in a southwesterly direction. A bright pinkish light followed in its path, and after it had disappeared about 60° from the zenith, a pale pink color was visible for about three seconds.—*Report of L. M. Pindell, observer, Signal Corps.*

MIRAGE.

Mirage were observed as follows: Kimball and Webster, Dak., 28th; Hampton, Iowa, 10th, 11th, and 12th; Santa Fé, N. Mex., 17th and 19th.

SAND STORMS.

The only sand storms reported during the month occurred at Phœnix and Fort McDowell, Ariz., on the 6th.

VERIFICATIONS.

FORECASTS FOR 24 HOURS IN ADVANCE.

[Verifications made by Assistant Professor C. F. Marvin, assisted by Mr. H. E. Williams, chief clerk of the Forecast Division.]

The forecasts for districts east of the Rocky Mountains for September, 1889, were made by Captain James Allen, 3d Cavalry, Signal Officer, and those for the Pacific coast districts were made at San Francisco, Cal., by 2d Lieutenant J. E. Maxfield, Signal Corps.

Percentages of forecasts verified, September, 1889.

States.		States.	
Maine	80.5	Kentucky	84.6
New Hampshire	83.9	Ohio	80.4
Vermont	84.5	West Virginia	86.3
Massachusetts	87.1	Indiana	83.2
Rhode Island	85.8	Illinois	84.3
Connecticut	83.7	Lower Michigan	81.7
Eastern New York	82.1	Upper Michigan	70.6
Western New York	82.7	Wisconsin	78.7
Eastern Pennsylvania	82.7	Minnesota	82.4
Western Pennsylvania	80.4	Iowa	79.5
New Jersey	77.5	Kansas	85.0
Delaware	74.8	Nebraska	83.1
Maryland	76.0	Missouri	78.7
District of Columbia	76.3	Colorado	83.3
Virginia	80.5	Dakota	82.3
North Carolina	82.1	Southern California*	86.1
South Carolina	84.9	Northern California*	88.9
Georgia	85.3	Oregon*	88.9
Eastern Florida	93.9	Washington Territory*	84.5
Western Florida	89.0	*By elements:* Weather	85.5
Alabama	89.2	Temperature‡	78.1
Mississippi	87.0	Monthly percentage of weather and temperature combined†	82.5
Louisiana	89.3		
Arkansas	77.3		
Tennessee	82.5		

* In determining the monthly percentage of weather and temperature combined, the Pacific coast states are not included. † The monthly percentage of weather and temperature combined is determined by multiplying the percentage of weather by 6, and the percentage of temperature by 4, and dividing their sum by 10. ‡ The forecasts of temperature in districts east of the Rocky Mountains for September, 1889, were made with reference to the maximum temperature alone; that is, a prediction of warmer or cooler indicated that the maximum temperature of the day designated would be higher or lower than the maximum of the previous day.

FORECASTS FOR 48 AND 72 HOURS IN ADVANCE.

Appreciating the great importance that long time predictions possess for the general public, the Chief Signal Officer has authorized forecasts for forty-eight and seventy-two hours, covering the second and third day in advance. Such forecasts are optional with the predicting officer, and are only made when clearly in the public interest, and cover, in all cases, considerable areas of country, and are not confined to localities.

Percentages of verifications of forecasts made for second day in advance. Number of predictions made: weather, 38; temperature, 44. Percentages of verifications: weather, 73.2; temperature, 83.9. Weather and temperature combined, 78.4.

Percentages of verifications of forecasts made for third day in advance. Number of predictions made: weather, 13; temperature, 7. Percentages of verifications: weather, 97.7; temperature, 35.9. Weather and temperature combined, 81.3.

FORECASTS FOR 48 AND 72 HOURS IN ADVANCE, FOR AUGUST, 1889.

[Made by Capt. H. H. C. Dunwoody.]

Percentages of verifications of forecasts made for second day in advance. Number of predictions made: weather, 24; temperature, 36. Percentages of verifications: weather, 71.7; temperature, 94.4. Weather and temperature combined, 80.8.

Percentage of verifications of forecasts made for third day in advance. Number of predictions made: weather, none; temperature, 8. Percentage of verifications: temperature, 100.

CAUTIONARY SIGNALS FOR SEPTEMBER, 1889.

Statement showing percentages of justifications of wind signals for the month of September, 1889:

Wind signals.—(Ordered by Captain James Allen.) Total number of signals ordered, one hundred and fifty-five; justified as to velocity, wholly, ninety-five, partly, ten; justified as to direction, one hundred and fifty-one. Of the signals ordered, one hundred and fourteen were cautionary, of which seventy-three were wholly, and two partly, justified; and forty-one were storm signals, of which twenty-two were wholly, and eight partly, justified. Seventy-one signals were ordered for easterly winds, of which sixty-seven were justified, and eighty-four were ordered for westerly winds, all of which were justified. Percentage of justifications, 71.6.

Cold-wave signals.—(Ordered by Assistant Prof. T. Russell.) Two cold-wave signals were ordered during the month, neither of which were justified.

Percentages of local verifications of weather and temperature signals reported by directors of the various State Weather Services for September, 1889.

States.	Weather.	Temperature.	States.	Weather.	Temperature.
Illinois	74.6	80.1	Missouri	82.0	85.0
Indiana	80.0	83.0	Nebraska	88.0	85.9
Kansas	92.7	89.8	New Jersey	89.0	92.5
Louisiana, northern	68.0	96.0	New York	79.0	80.0
Louisiana, southern	64.0	92.0	Ohio	79.0	85.0
Michigan	86.1	82.8	Pennsylvania	88.0	89.0
Minnesota	76.0	73.0	South Carolina	86.4	84.6

STATE WEATHER SERVICES.

[*Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.*]

The following extracts are republished from reports for September, 1889, of the directors of the various state weather services:

ALABAMA.

The temperature was below the normal. Light frost occurred on the 19th, 20th, and 28th, but caused no damage to vegetation.

The rainfall during the month was not uniformly distributed over the state. In north Alabama the precipitation was large and showers were constant during the month; in middle Alabama there was a deficiency of rain, and in

many sections wells have almost run dry, while along the Florida line the precipitation has been more frequent. The average rainfall for the state was 1.44 above the normal; this increase over the normal was due to the excessive rains throughout north Alabama.

SUMMARY.

Temperature.—Monthly mean, 73.6; highest monthly mean, 80.8, at Wiggins; lowest monthly mean, 66, at Valley Head; maximum, 99.5, at Citronelle, 16th; minimum, 36, at Valley Head, 20th and 28th; range for state, 63.5; greatest local monthly range, 53, at Valley Head; least local monthly range, 40, at Mobile.

Precipitation.—Average for the state, 4.51; greatest, 8.83, at Elkmont; least, 1.22, at Livingston.

Wind.—Prevailing direction, north.—*P. H. Mell, Signal Corps, Auburn, director.*

ARKANSAS.

SUMMARY.

Temperature.—Monthly mean for the state, 70.7; highest monthly mean, 74.8, at Texarkana; lowest monthly mean, 65.8, at Ozone; maximum, 96, at Paris, Texas, 1st and 2d; minimum, 40, at Devall's Bluff, 29th, and at Lead Hill, 26th; range for state, 56; greatest local monthly range, 54, at Devall's Bluff and Lead Hill.

Precipitation.—Average for the state, 4.70; greatest monthly, 8.64, at Newport; least monthly, 1.83, at El Dorado.—*M. F. Locke, Commissioner of Agriculture, Little Rock, director; W. U. Simons, Sergeant, Signal Corps, assistant.*

COLORADO.

SUMMARY.

Temperature.—Monthly mean for the state, 54.3; highest monthly mean, 64.3, at Cañon City; lowest monthly mean, 41.8, at Climax; maximum, 101, at Las Animas, 1st; minimum, 8, at Breckenridge, 25th; monthly range, 93.

Precipitation.—Average for the state, 0.62; greatest monthly, 1.31, at Palmer Lake; least monthly, 0.06, at Las Animas.—*Prof. F. H. Loud, Colorado Springs, director; T. W. Sherwood, Sergeant, Signal Corps, assistant.*

DAKOTA.

SUMMARY.

Temperature.—The average temperature for the state, 56, is about the normal. Highest monthly mean, 61, at Yankton; lowest monthly mean, 52, at Wolsey; maximum, 100, at Onida, 1st; minimum, 22, at Steele, 26th; range, for state, 78; greatest daily range, 53, at Valentine, Nebr.; least daily range, 4, at Bismarck and Yankton, and at Saint Vincent, Minn.

Precipitation.—The average for the month, 2.85, is about 1.13 above the normal; greatest monthly, 6.25, at Alexandria; least monthly, 0.37, at Rapid City. The principal precipitation of the month occurred on the 12th, 13th, and 14th.—*S. W. Glenn, Sergeant, Signal Corps, Huron, in charge.*

ILLINOIS.

SUMMARY.

Temperature.—Monthly mean for the state, 63.1; maximum, 98, at Quincy, 3d; minimum, 27, at Riley, 27th; mean of maximum temperatures, 90.1; mean of minimum temperatures, 35.1; monthly mean of maximum and minimum temperatures for the state, 64.7.

Precipitation—Monthly average for the state, 3.74.

Wind.—Prevailing direction, southeast.—*John Craig, Sergeant, Signal Corps, Springfield, in charge.*

INDIANA.

SUMMARY.

Temperature.—The monthly mean temperature for September, 1889, is 1.7 below the normal; that of September, 1888, being the only one which was lower during the past eight years. The highest temperature was noted at most stations on the 1st, and the lowest on the 22d; the range being quite large. Warmer periods occurred only during the first half of the month; from the 1st to 4th, and from the 9th to 15th. The greatest deficiency in temperature is noted in the northern portion, 3.0, and 2.9 in the southern portion, while the deficiency in the central portion was only 1.4. Hoar frost formed frequently in all sections, but caused no marked injury to vegetation.

Precipitation.—The average amount of precipitation for the state is 0.84 in excess of the normal; that in the southern portion is 1.56, and in the central portion, 0.65 in excess, while that in the northern portion is 0.81, deficient, La Fayette alone, in the northern portion, reporting an excess of the normal. Rain was not so very frequent during the month, but large amounts fell on some days; the greatest in twenty-four hours being 5.00, reported for Huntingburgh, and the next largest, 3.30, from Princeton, both stations being in the extreme southwest portion of the state. The weather was very favorable to all farm work.—*Prof. H. A. Huston, La Fayette, director; C. F. R. Wappenhans, Sergeant, Signal Corps, assistant.*

IOWA.

September, 1889, was cool and fair; southerly and westerly winds prevailing. The rainfall was generally less than the normal. The mean temperature of the air was almost 1 below the normal. The first decade was warm, being 2.5 above the normal; the second and last decades were cold, being as much below the normal. The most notable spell extended from the 16th to the 21st, and averaged 10 below the normal. The 13th and 14th were the warmest days, exceeding the normal by 12.

The total rainfall in most of the northwestern third of the state was decidedly below the normal, averaging less than 1.00. In southeastern Iowa, from Wayne to Linn counties, and east to the great river the rainfall was above the normal, averaging about 4.00 and exceeding 7.00 in Keokuk, Washington, and Louisa counties; in this belt the rainfall exceeded 3.00 on the 12th. In the broad belt between these two extreme regions the rainfall was about normal. No severe winds occurred during the month.—*Dr. Gustavus Hinrichs, Iowa City, director.*

IOWA WEATHER CROP BULLETIN SERVICE.

The first three days of the month brought a general excess of temperature, followed on the 4th and 5th by a cool wave, with light frost on the morning of the 5th, which, however, caused no damage to crops. The cool wave continued until the 10th, and from that date until the 15th, the temperature was comparatively high. The temperature during the last half of the month was below the normal, bringing general frosts from the 16th to 28th, inclusive, the minimum occurring on the 27th. There was a general deficiency of rainfall, except in the southeastern portion of the state, where an excess occurred, especially in Washington county, where the total for the month amounted to 7.19, at Washington.

SUMMARY.

Temperature.—Monthly mean, 61.4; highest monthly mean, 66.5, at Mount Vernon; lowest monthly mean, 56.6, at Wesley; maximum, 94, at McGregor, 1st; minimum, 23, at Fayette, 27th; average maximum, 87.8; average minimum, 30; greatest local monthly range, 67, at McGregor and Fayette; least local monthly range, 49, at Sioux City; monthly range for the state, 71; average monthly range, 57.4.

Precipitation.—Average for the state, 2.76; greatest, 7.19, at Washington; least, 0.30, at Esterville.

Wind. -Prevailing direction, southwest.—*G. M. Chappel, Sergeant, Signal Corps, Des Moines, in charge, Iowa Weather Crop Bulletin Service.*

KANSAS.

The month of September has been characterized by warm noons and cool nights, and has been an unusually cool September. Four rain-waves crossed the middle and eastern divisions, while the western was affected by but three, and then not generally. Two cold waves crossed the state, following the rain-waves of the 4th and 24th. The drought in the southeastern counties during August has been completely washed out by the abundant rains that have visited that section this month.

SUMMARY.

Temperature.—The temperature is deficient over the entire state, the deficiency being greatest in the eastern division, where it amounts to from 2.0 to 4.7. This deficiency uniformly diminishes toward the west. The highest and lowest temperatures recorded in the state occurred in the western division, yet the greatest local range of temperature occurred in the western part of the eastern division.

Precipitation.—The average rainfall for the state is 1.90. It has been very unequally distributed, the southeastern counties receiving the major portion, while some counties in the central and western divisions received none. The rainfall is normal from Doniphan to the southeastern part of Pottawatomie; thence through the central part of Morris; thence to the southeast corner of Chase; thence southwest to and through Sumner, east and south of Wellington. East of this line there is an excess which culminates in Chautauqua, where it amounts to 4.44, but then diminishes east and north, being 3.46 in Montgomery, and dropping to 1.31 in Shawnee, 1.58 in Douglass, and 2.23 in Leavenworth. West of the normal line there is a deficiency which culminates in Rooks, Ellis, western part of Russell, and extends southwest through Rush, Ness, Lane, and Scott, where no rain fell during the month. This occurred also in the western part of Stafford, and western parts of Wallace and Sherman. A local excess occurs in the western part of Reno.

Wind.—Prevailing direction, south.—*Prof. J. T. Lovewell, Topeka, director; T. B. Jennings, Sergeant, Signal Corps, assistant.*

KENTUCKY.

SUMMARY.

Temperature.—The average temperature of the state for the month, as deduced from the tri-daily observations, was 65.3; from the mean of the average maximum and average minimum temperatures, 66.9. These figures show a departure of about 2 below the normal. The highest temperature reported was 97 at Pellville on the 13th, and the lowest, 36, at Murray on the 28th. The average monthly range of temperature was 50.2; the greatest, 55.5, at Shelbyville, and the least, 38, at Franklin.

Precipitation.—The average precipitation of the state for September was 5.12 inches, which is about two inches in excess of the normal amount. The greatest rainfall reported was 8.24 at Owenton, and the least, 2.47, at Mt. Sterling. The rainfall was very evenly distributed throughout the state, a large portion of it falling between the 1st and 7th. The average number of rainy days was 8.

At Louisville on September 30th the total amount of rainfall since January 1st was 10.77 less than the normal.

Wind.—Prevailing direction, south.—*Dr. E. A. Grant, Louisville, director; Frank Burke, Sergeant, Signal Corps, assistant.*

LOUISIANA.

There was an average deficiency of nearly one degree in the mean temperature of September, 1889, for the state of Louisiana, and this deficiency was

maintained in both the northern and southern sections. The first few days and the period from the 11th to the 16th were unusually warm, and the latter period was followed by a cool wave of considerable severity, the temperature falling to 44 in the central parishes, and to from 58 to 62 in the Gulf parishes. There was an average rainfall of but 1.65 in the northern section, which was 2.85 below the normal of the past twenty years. The average amount received in the southern section was 2.98, a deficiency of 1.47 as compared with a twenty-year normal. The rain in northern Louisiana fell between the 1st and 10th, generally, and after the latter date there was but an occasional light shower here and there. In southern Louisiana there were three periods of rain, the first being from the 1st to 7th, the second on the 17th, and the third from the 23d to 26th. The amount that fell during the latter rainy spell was more than the total fall of the remaining dates.

SUMMARY.

Temperature.—Monthly mean, 76.2; highest monthly mean, 80.2, at Port Eads; lowest monthly mean, 73.2, at Natchitoches; maximum, 110, at Cameron, 5th; minimum, 44, at Marksville and Cheneyville, 19th; range for the state, 66; greatest local monthly range, 52, at Vidalia and Cheneyville; least, 28, at Shell Beach and Port Eads; mean daily range, 21.2.

Precipitation.—Average for the state, 2.47; for the northern section, 1.73; southern section, 2.98; greatest local monthly rainfall, 6.80, at Houma; least, 0.33, at Alexandria.

Wind.—Prevailing direction, south.—*R. E. Kerkam, Sergeant, Signal Corps, New Orleans, in charge.*

MICHIGAN.

The features of the month were the high temperatures of the first part of the month, and the low temperatures of the last half, with killing frost on the 22d and 27th, and the continued drought in the southern half of the state.

SUMMARY.

Temperature.—The mean temperature for the month, 59.9, is 1.0 below the normal. The temperature was above the normal on twelve days, normal on one, and below the normal on seventeen days. The highest mean daily temperature, 72, occurred on the 3d, when the temperature was 7 above the normal, and the lowest, 45, occurred on the 21st and 27th, when the temperature was 15 and 13, respectively, below the normal. The highest mean daily temperature in the past fourteen Septembers, 77, occurred on the 1st, 1880, and the lowest, 42, occurred on the 28th, 1888. The highest mean monthly temperature, 68.4, occurred in 1881, and the lowest, 56.7, in 1888. The maximum temperature for the month, 95, occurred on the 9th, at Highland station, and the least, 20, on the 6th, at Evart, and on the 22d, at Hart. Temperatures above 90 were generally reported in the southern half of the state on the 2d. Frosts were reported from the 14th to the 29th in different portions of the state, and those of the 22d and 27th were killing, and that of the 22d did considerable damage to corn and vines.

Precipitation.—The average rainfall for September, 1.98, is 1.24 below the average of fourteen years. The rainfall was below the average in all sections, from 0.48 in the upper peninsula to 1.83 in the central section. The rainfall in the upper peninsula, east of Alger and Schoolcraft counties, was above the average from 0.12 to 1.18. In the northern section of the counties of Alpena, Alcona, Iosco, Arenac, and the counties directly west of Arenac, the rainfall was below the average from 1.00 to 2.00, while the other counties in this section received more than the average rainfall for this month. In the central section, the counties of Allegan, Kent, Ottawa, and west portion of Barry, received rainfall nearly up to the average, while all counties east of the ones named received a rainfall that was over 2.00 below the average. In the southern section the rainfall was below the average in all counties. The largest amount recorded during the month, 5.60, occurred at Sault Ste. Marie, and the least, 0.46, at Port Huron. The drought has been most severe in the counties of Saint Clair, Macomb, Lapeer, Oakland, eastern portions of Genesee and Livingston, northern portions of Wayne and Washtenaw, where the amount of rainfall has been about fifty per cent. of the average. The heaviest rainfall recorded in the past fourteen Septembers, 5.39, occurred in 1879, and the least, 1.63, in 1882. The least amount of rainfall in the central and southern sections was recorded in 1882, and in the northern section in 1887.

Wind.—Prevailing direction, southwest.—*N. B. Conger, Sergeant, Signal Corps, Lansing, director.*

MINNESOTA.

As shown by reports from stations having the longest records, the departure from the normal temperature was only slight, there being a deficiency of less than 1.0. In the counties of the Red River Valley the rainfall for the month was much in excess of the usual amount; the departure being greatest at Moorhead, where the deposit was more than 200 per cent. in excess. In all other districts of the state the rainfall was deficient, notably so in the southern-central portion, which received less than one-sixth of the usual amount.

SUMMARY.

Temperature.—Monthly mean, 55.8; highest monthly mean, 60.6, at La Crosse, Wis.; lowest monthly mean, 50.4, at Pokegama Falls; maximum, 94, at Saint Vincent and Moorhead, 1st; minimum, 21, at Pokegama Falls, 21st; range for state, 73; greatest local monthly range, 66, at Saint Vincent; least local monthly range, 40, at Duluth; greatest daily range, 48, at Saint Vincent, 4th and 24th; and the same at Duluth, on the 10th.

Precipitation.—Average for the state, 2.09; greatest monthly, 6.27, at Moorhead; least monthly, 0.51, at Saint Paul.

Wind.—Prevailing directions, south and southwest.—*John Healy, Private, Signal Corps, Saint Paul, in charge.*

MISSISSIPPI.

SUMMARY.

Temperature.—The month showed to a marked degree the changes in temperature denoting the approach of cold weather. On the 1st the mean temperature in all parts of the state was 78. On the 6th and 7th it fell from this value to 70. This slight depression was followed by a gradual rise until the 16th, when the maximum of the month was reached, the mean daily being 84 in the southern part and 82 in the northern. After the 16th a gradual fall occurred, reaching a mean of 60 or less on the 19th and 20th. The temperature then rose irregularly to another culmination on the 24th and 25th, reaching 77. Succeeding this there was a decline to about 59 on the 28th, and a rise to 75 on the 30th. Thus there was but little fluctuation during the first half of the month and an unusual disturbance of temperature during the latter half. The mean of the month was 73.4, 1 below the normal for September. The daily range of temperature varied considerably according to date and locality. The least was 3, at University, 17th, and the greatest, 39, at Louisville, 15th. The greatest local monthly range was at Louisville, from 102 on the 15th to 39 on the 20th, and the least monthly range at Pearlington, from 91 on the 14th to 59 on the 20th. The highest monthly mean temperature was 77, at Louisville, and the lowest, 68, at Aberdeen.

Precipitation.—The average number of days on which rain fell was six. The average amount for the state was 2.70, which was 1.11 less than the normal amount. This deficiency added to that at the beginning of the month makes the deficiency, since January 1st, 10.19. The rainfall was very unequally distributed, eleven stations reporting less than 1.00, and 17 stations more than 3.00. The heaviest rainfalls were, at Meridian, 3.27 (in one hour and forty minutes), 5th; at Loch Leven, 3.60, 6th; at Holly Springs, 2.80, 5th; at Greenville, 1.88 (within two hours), 16th; at Rienzi, 0.59 (in twenty minutes), 11th, and near Rienzi over 2.00, 2d; at Mobile, Ala., 2.72, 23d, and an unmeasured very heavy fall near Fayette, 25th.—*R. B. Fulton, Signal Corps, University, director.*

MISSOURI.

September, 1889, has been slightly cooler than the average, and over a greater part of the state an excess of rain has fallen.

SUMMARY.

Temperature.—The average at the central station, 67.1, is about 2 below the normal; highest maximum, 90.3, 14th; lowest minimum, 42.3, 27th. During the last fifty years the temperature has fallen to 40.5 as early as September 17th, in 1863; the lowest September temperature, 35, occurring September 30th, 1851. During fifty years the highest maximum has during some year or other risen to or above that of last month on every day of the month, excepting the 15th and 27th. In September, 1858, the temperature rose to 90 as late as September 30th.

Precipitation.—The greatest rainfall has occurred in an area bounded by a line drawn through Kansas City eastward to Mexico, thence westward through Boonville to Harrisonville, Cass Co. In this area the precipitation has been over 7.00. The maximum fall was 9.23, at Glasgow. To the northward the rainfall diminished to less than 4.00, while in the southern part of the state the fall was about 2.50. The rainfall was normal along a line running nearly eastward through Nevada, Rolla, Saint Genevieve, and thence southward to Charleston. South and west of this line the rainfall was less than the average for ten years ending 1887, the deficiency amounting to 2.4 at Lamar, where the normal September rainfall is 4.40. The excess of rainfall during last month was greatest, exceeding 3.00, over a narrow belt which includes Pleasant Hill, Glasgow, Mexico, and Louisiana. This belt traverses the region where the September rainfall is normally most abundant. The greatest excess was 5.00, at Glasgow, where the normal is 4.2. The heaviest rainfall of the month at the central station was 3.05 on the 5th.—*Prof. Francis E. Nipher, Saint Louis, director.*

METEOROLOGICAL REPORT OF THE MISSOURI STATE BOARD OF AGRICULTURE.

SUMMARY.

Temperature.—Mean temperature for the state, 56.4; maximum, 94, at Sedalia and Protem; minimum, 32, at Columbia and Steelville. The highest mean daily temperature was 70, at New Haven, and the lowest, 61.2, at Oak Ridge. The greatest monthly range of temperature, 59, occurred at Sedalia, and the least, 40, at New Haven. The first frost of the season occurred at Princeton, on the 16th, and light frost was quite general on the 19th, 26th, and 27th.

Precipitation.—Average for the state, 4.73; greatest monthly, 7.73, at Kansas City; least monthly, 2.01, at Springfield.—*Levi Chubbuck, Secretary of State Board of Agriculture, Columbia, director; A. L. McRae, Sergeant, Signal Corps, assistant.*

NEBRASKA.

The month of September has been a cool, dry month, with less than the normal number of rainy days.

SUMMARY.

Temperature.—The mean temperature for southern Nebraska was 61.6, which is about 3.0 below the normal; the month, however, was one of ex-

tremes, several days reaching 100, which is unusual for September, while the minimum for the month, 24, is also considerably lower than usual. Slight frost occurred on several days, but the first killing frost did not occur till near the end of the month, except in the northwestern portion of the state, where it occurred on the 6th. This is about the average date for the first killing frost.

Precipitation.—The rainfall for the month has varied from a small fraction of an inch in the western portions of the state to over three inches in parts of the eastern portions, reaching a maximum of 3.70 at Creighton. The number of cloudy days was about nine, or nearly double the usual number.—*Prof. Goodwin D. Swezey, Crete, director; G. A. Loveland, Corporal, Signal Corps, assistant.*

NEVADA.

SUMMARY.

Temperature.—September was an exceedingly dry and comparatively cool month. There was an average of twenty-three cloudless, four partly cloudly, and four cloudy days. The mean temperature for the state, as deduced from twenty-three monthly reports, 61.7, is nearly 5 below the normal, and about 10 below that of the same month last year. El Dorado Cañon reported the highest temperature, 110, on the 6th, and also the highest mean maximum temperature, 97.4. The lowest temperature for the month, 13, occurred at Elko, which station reported also the lowest mean minimum temperature. There were two warm periods during the month, the first from the 3d to the 7th, inclusive, and the second from the 28th to the 30th, inclusive, and two cold periods, from the 11th to 14th, and 22d to 24th, respectively. The atmosphere was smoky and hazy in many portions of the state, owing to extensive forest fires which were raging during the month, causing a great loss of timber. Frosts were reported from a number of stations throughout the state on the 12th, 13th, 14th, 24th, and 25th, doing little damage to vegetation.

Precipitation.—Excepting a few favored localities, the effects of the terrible and long-continued drought were felt all over the state during the month. Rain fell this year at only 7 out of a total of 24 stations, principally in Elko, White Pine, Nye, Esmeralda, and Lincoln counties, while this month last year rain was reported from 23 out of 24 stations, and was well distributed. There were no general or extensive storms during the month. On the 19th and 20th thunder-storms, accompanied with rain, occurred in the above named counties. Many mills have shut down, owing to the scarcity of water in rivers all over the state, and will remain so until November unless heavy snow storms occur before then. The average rainfall per station was 0.55. The largest amount of precipitation which fell at any one station during the month was 2.00 at Pioche. No snow fell during this month.—*Prof. Chas. W. Friend, Carson City, director; H. F. Alciatore, Private, Signal Corps, assistant.*

NEW ENGLAND METEOROLOGICAL SOCIETY.

New England weather during September was not characterized by any well-marked general peculiarities; the average temperature was about the normal, from which there were no wide deviations. The first general frost of the season, which was severe at only a few isolated stations, occurred on the 23d, about a week later than usual. In the northern part of the district there were fifteen days on which no precipitation occurred, giving a deficiency of about 0.75 in the amount for that region, while in the southern part rain fell on all but ten days, and the amount was about 1.00 in excess of the normal.

SUMMARY.

Temperature.—Monthly mean, 59.3 (110 stations); highest monthly mean, 65.7, at Olneyville; lowest monthly mean, 51.0, at Weathersfield Centre; maximum, 90, at Stratford, 4th; minimum, 17, at Weathersfield Centre, 28th; range for New England, 73; greatest local monthly range, 63, at Weathersfield Centre; least local monthly range, 25, at Block Island; greatest daily range, 47, at Stratford, 25th; least daily range, 0, at Walpole, 19th. The average temperature for September for 24 stations, having records for more than ten years, is 60.3; the average for September, 1889, is 61.3; departure, +1.0.

Precipitation.—Average for New England, 4.11 (138 stations); greatest, 7.07, at Voluntown; least, 1.65, at Bar Harbor. The average precipitation for September, for 34 stations, having records for more than ten years, is 3.35; the average for September, 1889, is 3.90; departure, +0.55.

Wind.—Prevailing direction, northeast.—*Prof. William H. Niles, Boston, Mass., president; Prof. Winslow Upton, Providence, R. I., secretary; L. G. Schultz, Sergeant, Signal Corps, assistant.*

NEW YORK.

SUMMARY.

Temperature.—The highest temperature reported was 91, at Utica, 4th; lowest 27, at Number Four, 23d; mean for the state, 60.4—the 5th being the hottest and the 22d the coldest day. The greatest local monthly range of temperature was 59, at Utica, and the least, 33, at Setauket. The temperature was generally above the normal, excepting at Albany, where it was 1.1; Canton, 2.9 below, and at Central Park (New York City), Factoryville, Ithaca, North Hammond and Oswego, it was but slightly below; at Ardenia the temperature was normal.

Precipitation.—Average for the state, 4.02. The rainfall was generally above the average, excepting at Humphrey, where it was 0.66 below, and along Lake Ontario, from Rochester to Saint Lawrence county, where it was below the normal. The greatest monthly rainfall was 8.12, at Tannersville, and the least was 1.82, at Alfred Centre. Average number of rainy days, 12.

Wind.—Prevailing direction, south.—*Prof. E. A. Fuertes, Ithaca, director; I. W. Brewer, Private, Signal Corps, assistant.*

NEW JERSEY.

SUMMARY.

Temperature.—The mean temperature for September, 1889, 64.8, is 0.5 below the average for the month, and 1.7 above the average for the corresponding month of 1888. The warmest days of the month were the 1st, 2d, 3d, 5th, and 6th, and the coolest the 19th, 20th, 22d, 23d, and 29th. Light harmless frosts occurred on the mornings of the 21st, 22d, and 23d.

Precipitation.—The average precipitation for the state, 8.36 is 4.47 above the average determined from past records of forty-nine stations, and 1.27 above the average for the corresponding month of 1888. One station reported a total exceeding 13.00, two exceeding 11.00, four exceeding 10.00, four exceeding 9.00, five exceeding 8.00, four exceeding 7.00, five exceeding 5.00, one exceeding 4.00, and two exceeding 3.00.

Wind.—Prevailing direction, northeast.—*E. W. McGann, Sergeant, Signal Corps, New Brunswick, in charge.*

NORTH CAROLINA.

The chief meteorological feature of the state for the month was the deficiency in temperature. The weather, however, was generally favorable to the growth of crops. The temperature was generally highest about the 16th and lowest on the 22d. The first light frost of the season occurred on the 19th.

SUMMARY.

Temperature.—The monthly mean for the state, 68.4, is 3.0 below the normal; maximum, 90, at Southern Pines, 16th; minimum, 30, at Highlands, 27th; range for state, 60; highest monthly mean temperature, 72, at Wilmington; lowest monthly mean temperature, 58.4, at Highlands; average monthly range, 42.8; average daily range, 16.5; least monthly range, 26, at Hatteras; greatest monthly range, 52, at Mount Airy.

Precipitation.—The monthly average for the state, 4.50, is 0.17 above the average. The rainfall was below the average in the eastern portion and above the average in the western portion of the state. The greatest monthly rainfall, 10.69, occurred at Lynchburgh, Va.; least, 1.68, at Raleigh.

Wind.—Prevailing directions, north and northwest; average direction, as deduced from many years observation, northeast.—*Dr. Herbert B. Battle, Raleigh, director; C. F. von Hermann, Sergeant, Signal Corps, assistant.*

OHIO.

SUMMARY.

Temperature.—The mean temperature of the northern section was 61.9; of the middle section, 62.7; of the southern section, 64.1; and of the state, 62.9. These means are 0.4, 1.1, 1.1, and 0.9 below the average for the sections and state. The maximum temperature was 98.5, at Georgetown, 1st. This is the highest temperature on record for September since the opening of the bureau. The minimum temperature, 27.6, occurred at Wauseon, 22d. The mean daily range of temperature was 21.1. The greatest daily range was 46.5, at Wauseon, 24th, and the least daily range, 4, at Georgetown, 16th; Cleveland, 17th; and at Jefferson, 20th and 30th. The first light frost of the season was reported by Wauseon, on the 7th, and from stations in all sections on the 18th to the 23d, 27th, and 28th. Heavy frost was reported by Findlay and Yellow Springs on the 21st, 22d, and 27th; by Wapakoneta, Wauseon, and Tiffin on the 21st and 22d; by Sidney on the 21st; Ottawa on the 22d.

Precipitation.—Precipitation was general and heavy in all sections on the 3d, 4th, 5th, 15th, 16th, 17th, 20th, 25th, and 30th; in the northern section on the 18th and 19th, and in the southern section on the 2d and 24th. Local rains occurred in all sections on the 6th, 26th, and 29th, and in the northern section on the 21st and 27th. The mean rainfall in the northern section was 3.57, in the middle section 3.38, and in the southern section 3.96. These means are 0.49, 0.21, and 1.22 above the seven-year averages for the sections. The mean for the state, 3.63, is 0.63 above the average.—*Prof. B. F. Thomas, Columbus, director; Lieut. Charles E. Kilbourne, secretary; C. M. Strong, Corporal, Signal Corps, assistant.*

PENNSYLVANIA.

SUMMARY.

Temperature.—The mean temperature for the month, deduced from the reports of fifty stations was 61.9, which is about 1 above the normal, and 2 above that of September, 1888. The greatest departures were in the southeastern part of the state. The means of the daily maximum and minimum temperatures were 70.8 and 53.0, respectively, making a daily mean of 63.9, and an average daily range of 17.8. The highest temperatures recorded were Columbus, 92; Lebanon, 91; Petersburgh, Greenville, New Castle, and Pittsburgh, 90. The lowest were Philipsburgh, 30; Clarion, New Castle, Petersburgh, Coudersport, Columbus, and Dyberry, 31. The highest temperature occurred on the 1st and 2d and the lowest on the 23d. Frost was general on the 23d. Stations with the highest monthly averages were Meyerstown, 68.7; Philadelphia, 66.4; Pottstown, 65.0; and Uniontown, 64.9. The lowest averages were Dyberry, 57.2; South Eaton, 57.5; Philipsburgh, 57.7; Eagle's Mere, 58.2; and Wellsborough, 58.4.

Precipitation.—The average precipitation for the state, 5.05, is an excess of 1.50. The greatest departures were in the eastern part of the state, where the following totals were reported: Kennett Square, 10.01; West Chester, 9.95; Eagle's Mere, 9.35; Coatesville, 9.12; Forks of Neshaminy, 8.76; and Doylestown, 8.61. The smallest totals were Wellsborough, 2.71; Altoona, 2.74; Grampian Hills, 2.76; Emporium, 2.84; and Somerset, 2.94. The heavy rains, from the 10th to the 15th, did not extend to the extreme western part of the state. A few stations reported light snow on the 19th, 20th, and 21st.

Wind.—Prevailing direction, west.—*Under direction of the Franklin Institute, Philadelphia; T. F. Townsend, Sergeant, Signal Corps, assistant.*

SOUTH CAROLINA.

SUMMARY.

Temperature.—The mean temperature for the month, 72.1, is 0.8 above the normal for the last three years. Highest monthly mean, 76.0, at Charleston; lowest monthly mean, 67.2, at Camden; maximum, 98, at Chester, 16th; minimum, 40, at Cedar Springs, 19th and 22d; range for state, 58. In most instances the highest maximum temperature occurred on the 15th and 16th and the minimum on the 19th and 20th.

Precipitation.—The average precipitation for the state, 3.34, is 1.42 below the normal for the last three years; greatest monthly, 7.37 at Walhalla; least monthly, 1.46, at Florence; greatest daily, 3.85, at Conway, on the 24th. Average number of rainy days, 5.2.

Wind.—Prevailing direction, southeast.—*Hon. A. P. Butler, Columbia, director; H. C. Seymour, Private, Signal Corps, assistant.*

TENNESSEE.

The principal meteorological feature for September was the unusual amount of rainfall. The temperature was very near the normal—slightly below. There were but few electrical disturbances—none very severe, and no high winds. The month, altogether, was rather a pleasant one, and very favorable for the farmer.

SUMMARY.

Temperature.—The mean temperature was 67.4, a little below the average September mean during the past seven years. The highest monthly mean was 75, at Bolivar, and the lowest was 62.6 at Fostoria. The maximum temperature was 95, on the 10th and 12th at Leeville, and on the 14th and 15th at Bolivar. The minimum temperature was 34.5, on the 28th at Lawrenceburgh. The maximum temperature was generally recorded on the 15th and 16th, and the minimum, with few exceptions, on the 28th. The daily ranges of temperature were generally less than the normal.

Precipitation.—The average depth of rainfall was 5.94, a remarkable amount for September, being more than 2.50 above the average September rainfall for the past seven years. Of this amount the eastern division received much the largest portion, being an average of nearly 7.00. The middle division received an average of about 5.33, and the western division an average of a little more than 5.00. During the first five days of the month the rains were continuous, culminating on the 5th with a very heavy rainfall, averaging for the entire state more than 1.50. The next heavy rainfall began in the western division on the 15th, and ended on the 17th in a general heavy rain. From the 17th to the 30th there was but little rain, principally in the eastern division, where heavy local rains were reported. In the extreme eastern part of the state the rainfall was generally light, and the least monthly amount is reported at Greeneville, while in the central and lower portions of that division the rainfall was remarkably heavy—the greatest amounts being reported at Clinton, 9.91; Kingston, 9.63; Loudon, 8.30; Andersonville, 8.58; Grief, 8.60; Dunlap, in Sequachee Valley, 8.69; Jacksboro, 7.64; Chattanooga, 7.87; Rockwood, 7.43; Charleston, 7.37; and other large amounts at various stations in that section of the state. The greatest local daily rainfall was 4.58 on the 16th at Andersonville, but perhaps the greatest local falls were at Nunnelly, on the 5th, where 4.20 fell in the space of eleven hours, and at Trenton, on the same day, where 3.44 fell in the space of twelve hours. Other heavy local daily falls are reported, as on the 2d at Bolivar, 2.80; on the 4th at McKenzie, 3.00; on the 5th at Cog Hill, 2.00; Grief, 4.00; Chattanooga, 2.02; Kingston Springs, 2.56; Clarksville, 2.02; Savannah, 2.32; Bolivar, 2.50; Covington, 2.48; on the 6th, Lookout Mountain, 2.25; on the 16th, Kingston Springs, 3.75; on the 17th, Springdale, 3.65; Jacksboro, 2.23; Rugby, 3.31; Dunlap, 3.21; Watkins, 2.25; Hohenwald, 2.62; on the 23d, Grief, 2.00; Dunlap, 2.09. There were nine days of general rains during the month, and about eight of local rains. Frosts occurred on eight days, all of them light, except that of the 28th, which did a small amount of damage.

Wind.—Prevailing direction, north and northwest.—*J. D. Plunket, M. D., Nashville, director; H. C. Bate, Signal Corps, assistant.*

TEXAS.

SUMMARY.

Temperature.—The mean temperature for the month of September was below the normal in all parts of the state, but the most marked deficiency occurred over the central portion, where in some localities it amounted to 6, and the smallest over the Panhandle and extreme western portion of the state, where it was from 1 to 2. The average temperature for the month over the state was 72, which is 3 below the 15-year normal. The highest temperature reported was 102, at Hartley, 9th, and the lowest, 32, from the same place, 25th. The temperature over the state was high during the first few days of the month, but after the 10th the weather was cool for the season, and a marked cool wave passed over the state from the 23d to the 27th.

Precipitation.—The rainfall during the month was unusually heavy east of the one-hundredth meridian; the amount over that section of the state being from 2.00 to 6.00 in excess of the 18-year normal. Over the western portion the precipitation was about normal. The number of dates on which rain fell during the month was unusually great over the entire state, and particularly over the eastern and southern portions, where it occurred quite generally on from ten to fifteen days. Three inches of snow fell at Folsom in the northwestern part of Panhandle on the 23d.—*D. D. Bryan, Galveston, director; I. M. Cline, Sergeant, Signal Corps, assistant.*

Meteorological record of Army post surgeons, voluntary, and other co-operating observers, September, 1889.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean.	Precip'n.
Alabama.	°	°	°	*Ins.*
Bermuda †	92	48*	72.3	3.14
Butler †	92	44	.....	2.78
Citronelle *†	100	49	79.4	7.97
Columbiana †	94	42	72.3	4.84
Decatur (1) †	.....	.....	.....	9.23
Decatur (2) †	94	42	69.5	8.86
Elkmont †	90	42	68.9	8.83
Eufaula †	96	46	74.4	2.38
Evergreen †	95	45	75.0	4.32
Fayette C. H. †	91	44	70.7	3.80
Fort Deposit †	95	47	75.0	4.43
Greensborough †	96	52	74.8	1.91
Livingston (1)	92h	47h	71.4h	1.22
Livingston (2) †	94	44	76.6	0.57
Marion †	92	44	71.6	2.57
Motes †	91*	45	75.0	6.38
Mount Willing † *	92	48	74.0	4.21
Mt. Vernon B'ks	98h	47	75.2d	6.36
Pine Apple †	92	40	72.6	0.67
Selma (2) † d	96	47	76.4	6.00
Tuscaloosa	92	44	76.0	1.89
Tuscumbia (1)	90	47	68.2	5.32
Tuscumbia (2) †	92	40	69.4	3.69
Union Springs	95	48	73.0	2.53
Uniontown	94	48	75.8	2.30
Valley Head †	89	36	66.2	6.44
Wiggins	99	55	80.4	4.39
Arizona.				
American Flag	.....	.....	.....	3.15
Arizona Dam	.....	.....	.....	1.00
Ash Creek	.....	.....	.....	0.65
Banghart's	.....	.....	.....	0.40
Benson *	95	54	76.7	1.04
Bisbee	.....	.....	.....	3.79
Buckeye	.....	.....	.....	0.20
Calabasas	.....	.....	.....	2.51
Casa Grande *	109	68	84.7	0.50
Chloride	.....	.....	.....	0.60
Clifton	.....	.....	.....	1.71
Cooley's Springs	.....	.....	.....	1.46
Cottonwood	.....	.....	.....	1.10
Crittenden	.....	.....	.....	1.70
Dos Cabezas	.....	.....	.....	0.58
Dragoon	.....	.....	.....	0.18
Duncan	.....	.....	.....	1.27
Flagstaff	85	31	57.5	1.19
Florence	99	51	77.1	0.34
Fort Apache	90	32	65.0	0.89
Fort Bowie	92	32	67.1	2.79
Fort Huachuca	92	39	68.2	2.46
Fort Lowell	101	45	76.3	3.32
Fort McDowell	108	51	81.4	0.60
Fort Mojave	113	55	82.7	0.00
Fort Verde	99	38	71.8	0.69
Gila Bend *	104	64	83.6	0.00
Globe	100	46	72.5	5.90
Holbrook *	92	37	69.6	0.67
Lochiel *	88	46	65.6	2.17
Maricopa *	98	65	63.6	.....
Mayer	.....	.....	.....	0.48
Mesa City	.....	.....	.....	0.65
Mineral Park	.....	.....	.....	0.63
Mount Huachuca	93	43	69.6	3.04
New River	103	48	78.2	0.05
Oro	.....	.....	.....	1.71
Pantano *	93	54	70.5	2.52
Peoria	108	50	82.0	0.90
Pinedale	.....	.....	.....	1.05
Red Rock	.....	.....	.....	1.04
Saint John's	.....	.....	.....	0.85
San Carlos	107	46	76.9	2.13
San Simon *	105	51	74.7	.....
Seligman	95	36	68.4	3.10
Show Low	.....	.....	.....	1.15
Signal	103	55	80.6	0.42
Silver King	.....	.....	.....	0.97
Simmons	.....	.....	.....	0.12
Stanton	.....	.....	.....	1.32
Strawberry	.....	.....	.....	3.50
Teviston	.....	.....	.....	2.30
Texas Hill *	112	71	86.2	0.00
Tip Top	.....	.....	.....	0.26
Tres Alamos	.....	.....	.....	2.84
Tuba City	.....	.....	.....	0.30
Tucson (1) *	100	53f	77.7d	3.12
Walnut Grove	.....	.....	.....	0.06
Wilcox *	100	50	73.5	2.79
Williams	81	30	50.2	4.13
Willow Springs	.....	.....	.....	0.92
Winslow	92	46	70.6	0.31
Wood Cañon	.....	.....	.....	1.41
Yuma *	102	70	84.2	0.00
Arkansas.				
Arkansas City †	.....	.....	.....	2.07
Camden †	88	53	72.0	6.84
Conway	91	47	69.5	4.78
Devall's Bluff †	94	40	69.4	3.30
El Dorado †	87	48	69.4	1.83
Forrest City †	90	46	70.3	2.82
Fulton †	.....	.....	.....	5.22
Helena (1) †	.....	.....	.....	3.78
Helena (2) †	94	46	70.8	3.50
Hot Springs	93	50	74.7	6.50

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Arkansas—Cont'd.	°	°	°	*Ins.*
Lead Hill	94	40	68.2	4.33
Little Rock B'ks	94	49	72.2	6.80
Lonoke *	90	53	73.2	3.25
Monticello †	94	50	74.0	2.40
Newport (1) †	.....	.....	.....	4.84
Newport (2) †	94	44	69.3	5.14
Osceola †	92	46	67.1	3.80
Ozone †	82	44	65.8	8.08
Pine Bluff †	92	50	72.8	0.21?
Prescott †	88	52	71.3	0.38?
Russellville †	93	48	70.8	6.14
Stuttgart †	92	44	70.2	1.94
Texarkana †	94	52	74.8	4.68
Washington †	90	49	71.9	3.53
Winslow †	83	36	65.0	7.15
British Columbia.				
New Westminster	79	40	56.7	3.69
California.				
Alcade *	106	60	80.5	0.00
Alcatraz Island	88	51	59.9	0.00
Almaden *	97	52	71.3	0.00
American Hill *	98	48	67.0	.....
Anaheim *	102	60	76.2	0.76
Anderson †	103	47	76.2	0.00
Angel Island	95	50	65.0	0.00
Aptos *	86	48	62.9	0.00
Athlone *	108	55	77.9	0.00
Auburn *	98	46	71.9	0.00
Bakersfield *	98	63	79.3	0.00
Barstow	104	46	75.8	0.07
Beaumont *	98	60	77.3	0.00
Belmont *	95	55	69.5	0.00
Benicia Barracks	100	51	70.2	0.00
Berendo *	106	61	77.9	0.00
Berkeley	87	48	62.5	0.00
Bishop Creek *	102	55	76.7	0.00
Borden *	105	46	74.8	0.00
Boulder Creek *	100	39	65.7	0.00
Brentwood *	100	58	72.6	0.00
Brighton *	106	50	75.2	0.00
Byron *	102	58	75.9	0.00
Cactus *	110	72	91.3	0.10
Calistoga *	97	38	67.4	0.00
Castroville *	84	46	63.5	0.00
Centreville *	104	56	71.0	.....
Chico *	103	53	77.9	0.00
Cisco *	82	39	59.4	0.00
Colgrove	.....	.....	.....	T.
Colfax *	97	54	72.6	0.00
Colton *	102	58	76.0	0.04
Corning *	109	54	77.6	0.00
Crescent City	.....	.....	.....	1.52
Davisville *	107	54	76.5	0.00
Delano *	106	64	82.3	0.00
Downey *	96	56	72.4	0.84
Dunnigan *	99	60	74.8	0.00
Edgewood *	85	36	59.9	0.00
El Dorado *	101	50	71.1	0.00
Elmira *	105	54	75.1	0.00
El Verano *	102	45	67.0	0.00
Emigrant Gap *	87	44	64.4	0.00
Esperanza *	108	52	78.8	0.00
Evergreen	.....	.....	.....	0.00
Farmington *	105	53	74.9	0.00
Felton *	103	36	65.8	0.00
Florence *	98	57	72.5	0.00
Folsom *	103	56	76.8	0.00
Fort Bidwell	90	32	60.7	0.00
Fort Gaston	95	39	60.5	T.
Fort Mason	85	47	56.8	0.00
Georgetown †	94	44	71.0	0.00
Gilroy *	102	48	67.8	0.00
Girard *	95	48	69.2	0.40
Goshen *	104	56	75.7	0.00
Grass Valley	.....	.....	.....	0.00
Hollister *	101	48	69.6	0.00
Hornbrook *	96	38	66.0	0.00
Hydesville †	86	33	58.6	0.35
Ione *	100	45	72.2	0.00
Iowa Hill *	95	54	72.1	.....
Jolon	107	.....	.....	0.00
Julian †	91	52	66.7	0.00
Keeler *	95	53	73.8	0.08
Keene *	98	55	71.5	0.42
King City *	102	38	72.0	0.00
Kingsburgh *	104	54	77.8	0.00
Knight's Landing *	98	50	76.1	0.00
La Grange *	105	47	76.0	.....
Lathrop *	104	50	71.6	0.00
Laurel *	99	50	69.7	0.00
Lemoore *	99	57	75.1	0.00
Livermore *	98	48	68.0	0.00
Livingston *	108	52	76.5	0.00
Long Beach *	96	59	73.1	0.00
Los Angeles *	100	57	72.5	0.00
Los Gatos *	100	49	72.1	0.00
Mammoth Tank *	108	73	88.6	0.00
Martinez *	100	45	68.4	0.00
Marysville *	99	60	82.6	0.00
Menlo Park *	96	48	66.3	0.00
Merced *	106	52	75.3	0.00
Modesto *	103	55	77.0	0.00
Mojave *	116	60	80.5	0.27

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
California—Cont'd.	°	°	°	*Ins.*
Montague *	99	48	75.5	0.00
Monterey *	88	50	65.0	0.00
Monterey *(Hotel del Monte)	83	48	62.6	0.00
Napa*	97	50	63.4	0.00
National City*†	95	52	69.9	0.00
Newark *	96	50	69.8	0.00
Newhall *	102	54	71.9	0.00
Newman *	106	52	73.5	0.00
Niles *	96	45	68.1	0.00
Norwalk *	97	50	73.4	0.00
Oakland (1)	93	49	63.2	0.00
Oakland (2) *	90	50	63.1	0.00
Ontario *	100	70	83.6	0.00
Oroville	96	42	74.8	0.00
Pajaro *	88	56	64.4	0.00
Paso Robles*	101	42	67.9	0.00
Petaluma *	99	42	66.4	0.00
Placerville*	99	50	68.0	0.00
Pomona*	92	62	76.5	0.00
Presidio of San F.	90	46	60.0	0.05
Puente *	102	57	74.8	0.00
Red Bluff *	105	57	76.9	0.00
Redding *	104	53	76.1	0.00
Riverside	96	48	71.2	0.09
Rocklin *	105	56	75.7	0.00
Rumsey *	104	62	79.4	0.00
Sacramento (1)	92	41	63.4	0.00
Sacramento (2)	90	53	70.3	0.00
Salinas (1) *	88	48	60.2	0.00
Salinas (2) *	82	47	65.0	0.00
Salton *	109	60	86.9	0.00
Sanger Junction*	112	54	78.4	0.00
San Ardo*	104	45	69.0	0.00
San Diego B'ks	92	58	70.8	0.00
San Fernando *	102	50	73.5	0.32
San Gabriel *	98	58	74.3	0.00
San José *	95	50	67.7	0.00
San Mateo *	90	45	64.8	0.00
San Miguel*	102	48	70.4	0.00
San Pedro *	102	60	75.6	0.00
Santa Ana *	100	60	73.8	0.00
Santa Barbara (1)	100	51	68.8	0.00
Santa Barbara (2) *	98	60	73.2	0.00
Santa Clara *	96	43	66.9	.....
Santa Cruz *	93	50	67.5	0.00
Santa Margarita*	100	42	71.8	0.00
Santa Maria	100	42	66.8	0.00
Santa Monica*	91	64	72.8	0.33
Santa Paula *	105	58	73.2	0.00
Santa Rosa*	90	42	65.3	0.00
Selma *	102	58	80.0	0.00
Seven Palms *	115	70	87.4	0.00
Shingle Springs *	99	55	76.4	0.00
Sims *	99	40	64.8	0.00
Sisson *	85	43	58.5	0.00
Soledad *	98	42	63.1	0.00
Soquel *	92	46	65.8	0.00
South Side *	104	50	74.4	0.42
South Vallejo *	83	50	62.4	0.00
Spadra *	105	53	72.5	0.00
Steeles	99	44	67.1	.....
Stockton (2) *	98	54	74.7	0.00
Summit *	78	40	56.1	0.00
Suisun City *	102	52	69.6	0.00
Susanville *†	89	37	62.9	0.00
Tehachapi *	90	52	67.6	0.00
Tehama *	100	60	76.0	0.00
Templeton *	105	43	68.0	0.00
Towles *	90	56	72.8	0.00
Tracy *	106	62	79.1	0.00
Traver *	102	60	75.2	0.00
Tropico *	102	51	72.5	0.00
Truckee *	88	36	61.1	0.00
Tulare *	106	57	79.1	0.00
Turlock *	103	54	74.0	0.00
Vacaville (1)	103	54	74.5	0.00
Vacaville (2) *	98	55	73.5	0.00
Valley Springs *	97	55	76.1	0.00
Volcano Springs *	114	60	89.7	0.00
Walla Walla Creek *	92	36	55.8	0.00
Walnut Creek	102	50	71.0	.....
Westley *	104	52	75.6	0.00
Wheatland	101	49	72.6	0.00
Whittier *	109	60	76.5	0.00
Willow (1)	103	47	74.3	0.00
Willow (2) *	102	50	74.7	0.00
Winters *	105	56	80.2	0.00
Woodland *	94	54	70.9	0.00
Canada.				
McGill Col. Observatory, Montreal.	82	38	59.9	4.63
Colorado.				
Alma	75	8	43.0	0.48
Breckenridge	84	8	47.0	.....
Cañon City	94	32	64.3	1.01
Climax	.....	.....	41.8	1.20
Coulter †	81	15	47.8	0.83
Delta †	96	39*	56.8	1.30
Dolly Varden Mine	60	5	32.9	.....
Durango †	.....	.....	.....	1.30
Eagle Farm	.....	.....	.....	1.12
Fort Collins	93	23	57.3	0.42
Fort Crawford	89	26	60.4	0.67
Fort Lewis	82	21	53.8	0.90
Fort Logan	96	28	60.5	0.51
Fort Lyon	101	18	65.4	0.09
Georgetown	77	27	52.0	0.90
Greeley	90	29	58.8	0.25
Gunnison	.....	.....	50.5	0.48
Husted	95	27	58.0	0.55
Idaho Springs	86	21	58.5	0.59
Julesburg	95	28	59.9	0.35
Lamar	.....	.....	.....	0.50
La Porte	.....	.....	.....	0.35
Las Animas	101	28	62.3	0.06
La Veta	.....	.....	.....	1.48
Leadville	72	14	46.0	0.53
Livermore	.....	.....	.....	0.70
Longmont†	96	32	56.6	0.63
Middle Box Elder	.....	.....	.....	0.28
Monte Vista	87	18	55.3	0.29
Palmer Lake	91	27	55.7	1.31
Paoli	.....	.....	59.7	0.50
Pike's Peak	52	2	31.7	.....
Rifle Falls	.....	.....	54.6	0.89
Rocky Ford	98	36*	60.2	0.26
San Luis Ex. Sta	.....	.....	56.4	0.35
Sun View	.....	.....	59.2	.....
T. S. Ranch	86	30	62.0	0.85
Thon	89	29	57.5	0.93
Upper Pine	.....	.....	.....	0.67
Connecticut.				
Birmingham	.....	.....	.....	4.85
Canton	84	36	.....	6.80
Clark's Falls	.....	.....	.....	5.74
Colchester	81	40	62.6	.....
Falls Village	.....	.....	.....	4.47
Fort Trumbull	82	39	64.8	4.78
Hartford (2)	.....	.....	.....	3.13
Lebanon	.....	.....	.....	6.15
Mansfield	81	36	59.7	4.00
Middletown	82	40	61.8	4.72
New Britain	.....	.....	.....	4.29
New Hartford (1) *	80	34	56.0	6.38
New Hartford (2)	.....	.....	.....	6.82
Newington	.....	.....	.....	4.56
North Woodstock	.....	.....	.....	2.90
Shelton	81	36	62.2	6.28
South Manchester	.....	.....	.....	3.24
Thompson*	79	36	60.4	.....
Uncasville	.....	.....	.....	5.95
Vernon Centre	.....	.....	.....	2.87
Voluntown *	81	40	62.2	7.60
Wallingford	.....	.....	.....	5.02
Waterbury	83	33	62.0	4.26
West Simsbury	.....	.....	.....	4.66
Dakota.				
Alexandria†	92	32	58.1	6.25
Canton †	89	35	60.4	4.53
Clark †	92	31	55.2	5.29
Davenport	95	31	55.3	5.09
De Smet † *	.....	35	53.2	2.74
Fort A. Lincoln	96	26	55.9	0.54
Fort Bennett	100	32	58.9	1.16
Fort Buford	87	25	53.8	1.13
Fort Meade	91	28	57.2	0.67
Fort Pembina	96	26	53.4	2.88
Fort Randall	94	32	60.5	3.09
Fort Sully	98	35	61.4	1.19
Fort Totten	98	29	55.8	1.62
Fort Yates	97	28	58.0	0.69
Gallatin	96	28	48.4	.....
Kimball † *	90	34	55.5	3.43
Napoleon †	96	25	54.4	2.29
New England City †	86	25	54.4	0.47
Onida *	100	34	55.5	0.37
Roscoe †d	91	26	53.6	1.76
Spearfish * †	92	39	57.0	1.42
Steele †	99	22	57.6	.....
Wahpeton †	97	31	58.0	1.97
Webster †	92	27	59.1	4.84
Wolsey *	90	27	55.0	3.31
Woonsocket	94	28	55.9	2.81
Delaware.				
Kirkwood *	.....	46	64.0	.....
District of Columbia.				
Washington B'ks	89	40	65.4	4.48
Florida.				
Altamonte Springs†	94	64	76.1	6.51
Alva †	94	68	79.8	10.51
Archer †	97	51	79.1	7.44
Fort Barrancas	95	49	78.1	6.64
Fort Meade *	88	65	77.0	5.58
Homeland *	92	68	81.2	5.65
Kissimmee City	93	65	80.6	4.52
Lake City †	102	52	78.2	9.89
Live Oak †	98	50	77.2	6.67
Manatee †	92	69	81.0	4.16
Matanzas *	90	63	77.2	3.72
Merritt's Island †	91	72	79.4	3.83
St. Francis B'ks	90	60	77.6	4.31
Villa City † *	94	71	79.6	5.56
Georgia.				
Albany †	93	50	73.6	2.30
Allapaha †	93	47	75.8	2.29
Andersonville †	100	44	80.2	1.75
Athens (1)	87	49	71.1	4.06
Athens (2) †	92	42	71.8	4.02
Bainbridge †	97	50	77.8	2.14
Blakely *	94	50	77.2	4.25
Camak †	92	46	73.0	2.10
Cartersville †	89	43	70.6	2.79
Columbus †	94	48	73.8	3.99
Diamond *	.....	48	67.0	5.35
Duck †	81	38	64.2	5.80
Eastman †	98	60	80.8	2.51
Forsyth *	94	56	75.8	3.70
Fort Gaines †	99	64	81.8	1.19
Fort McPherson	95	42	70.2	6.09
Gainesville †	84	44	66.1	8.45
Gillsville *	88	54	73.5	.....
Griffin †	88	48	71.8	4.12
Hephzibah *	88	50	73.7	2.91
Jesup †	93	51	76.2	2.18
Macon †	90	46	72.9	3.00
Marietta †	87	44	67.8	6.85
Milledgeville * †	90	46	72.4	2.50
Millen †	94	45	74.4	2.47
Newnan †	86	46	68.8	4.14
Point Peter *	.....	47	71.0	3.95
Quitman (2) †	100	50	79.7	1.81
Smithville †	100	44	75.3	1.40
Thomasville (1)	96	48	77.1	1.80
Thomasville (2) †	98	49	77.2	1.82
Toccoa †	88	44	70.2	8.97
Union Point †	92	42	71.4	1.82
Washington †	88	50	73.0	2.07
Way Cross †	98	44	75.0	1.40
Waynesborough †	89	47	71.9	1.49
West Point †	90	52	75.7	2.76
Woolley's Ford † *	82	52	67.6	.....
Idaho.				
Boisé Barracks	88	27	58.2	0.06
Era †	92	29	59.9	T.
Fort Sherman	86	26	54.7	0.38
Lewiston	88	34	60.1	0.44
Soda Springs † §	80	18	49.0	1.06
Illinois.				
Aurora (1)	89	28	61.5	.....
Aurora (2)	91	29	61.9	3.82
Beardstown †	.....	.....	.....	3.61
Beason	89	33	61.4	4.81
Belvidere	88	32	60.2	2.12
Brush Hill	93	40	66.1	2.97
Cedarville	88	37	61.2	3.75
Centralia	90	40	65.0	3.18
Collinsville	88	39	65.6	5.13
Dwight	93	31	64.3	2.92
Fairfield	92	40	68.2	5.49
Flora	87	33	64.0	5.66
Fort Sheridan	84	31	60.6	2.20
Golconda	89	44	67.3	4.78
Grand Tower †	.....	.....	.....	5.45
Greenville	93	35	64.1	4.24
Griggsville	91	40	62.9	4.56
Hennepin	92	30	63.1	3.83
Irishtown	90	40	66.1	3.43
Jordans Grove	90	37	65.8	2.27
Lacon	89	39	63.8	2.96
Lake Forest	84	30	59.3	2.22
Lanark	88	32	59.1	4.71
Louisville	87	36	62.7	5.60
Mascoutah	90	39	65.2	4.20
Mattoon *	91	34	62.9	3.13
McLeansborough	96	40	65.5	4.33
Mount Carmel †	.....	.....	.....	3.84
Mount Morris *	91	28	61.2	2.95
Olney	87	41	63.2	5.09
Oswego *	92	28	60.3	3.44
Ottawa	93	38	63.6	3.92
Palestine †	87	39	63.3	5.44
Pana	89	42	66.4	4.57
Peoria (1) †	.....	.....	.....	2.65
Peoria (2)	91	36	64.9	2.61
Philo *	93	28	62.0	2.64
Pontiac	94	32	63.1	3.80
Quincy	96	33	.....	.....
Richview	91	36	65.7	4.60
Riley	86	27	59.3	1.68
Rockford	89	32	61.1	1.95
Rock Island Ars'l	87	34	63.4	4.29
Sandwich *	93	38	64.4	3.12
South Evanston	85	31	61.8	2.42
Sycamore *	89	29	59.3	1.93
Warsaw †	.....	.....	.....	2.20
Watseka	89	32	61.9	2.71
Wheaton	90	32	58.8	.....
White Hall	88	40	66.3	4.22
Windsor †	88	35	64.6	4.26
Winnebago	96	33	63.2	1.66
Indiana.				
Angola	90	34	61.4	1.40
Blue Lick	87	40	65.0	3.58
Butlerville *	77	40	63.6	5.18
Cannelton	90	38	64.0	3.64
Columbia City	92	34	59.1	1.84
Columbus	.....	44	63.1	4.26
Connersville	90	40	65.0	3.34
Dana *	93	37	66.6	3.27
De Gonia Springs	86	41	65.3	8.22
Delphi	89	30	60.2	3.08
Evansville †	.....	.....	.....	6.58
Farmland	94	34	63.1	3.04
Franklin	89	37	61.9	4.22
Huntingburgh	88	48	67.0	2.41
Huntington †	.....	.....	.....	5.49
Jeffersonville	90	40	65.1	2.77
La Fayette	92	32	61.3	3.13
Logansport †	.....	.....	.....	2.10
Marion	91	38	61.5	4.78
Mauzy	92	31	50.0	5.80
Mount Vernon (1) †	.....	.....	.....	5.80
Mount Vernon (2)	88	41	63.9	2.34
New Providence †	91	32	61.0	1.39
Point Isabel	92	30	61.0	7.10
Princeton	89	36	63.7	4.80
Richmond	91	31	61.0	4.25
Rockville	94	36	65.0	4.13
Rushville †	.....	.....	.....	8.15
Scalesville	91	43	67.1	3.45
Seymour	88	39	60.2	3.80
Spiceland	93	36	65.0	5.42
Sunman †	91	33	62.6	5.19
Vevay	94	40	65.3	7.34
Vincennes †	.....	.....	.....	5.68
Worthington	83	38	61.5	.....
Indian Territory.				
Eufaula †	.....	.....	.....	6.65
Fort Gibson	91	38	68.9	5.63
Fort Reno	92	39	68.4	4.48
Fort Sill	96	38	68.9	4.69
Fort Supply	95	35	68.6	2.02
Healdton * †	92	52	71.2	6.52
Lehigh * †	.....	44	66.8	16.71
Oklahoma City †	92	38	66.8	4.56
Tulsa †	.....	.....	.....	3.85
Iowa.				
Amana †	87	30	61.0	4.37
Ames *	90	32	61.2	2.47
Bancroft	90	26	60.2	1.19
Belle Plaine *	90	28	59.0	2.94
Blakeville *	93	32	64.0	3.58
Carroll *	.....	40	59.0	1.08
Carson *	91	40	62.3	2.90
Cedar Rapids	89	26	60.6	3.70
Clarinda *	86	34	62.2	1.45
Clinton	91	29	61.0	3.44
Cresco	86	26	57.7	2.87
Eagle Grove *	88	32	62.6	1.55
Elkader *	90	30	59.8	3.56
Estherville *	87	32	62.0	.....
Fayette †	90	23	59.1	3.62
Fort Madison *	90	33	63.8	5.17
Gillett *	.....	34	54.4	2.20
Glenwood (1)	96	34	65.2	2.07
Glenwood (2) *	88	28	58.7	2.15
Grinnell	85	33	62.2	3.84
Hampton	87	28	58.6	0.99
Independence *	84	.....	60.5	3.99
Jefferson *	91	31	56.7	1.35
Le Claire †	.....	.....	.....	2.43
Logan †	87	30	62.2	1.32
Manson *	88	32	60.4	1.26
Maquoketa *	90	32	62.2	3.37
McCausland *	86	36	63.8	3.33
McGregor *	94	27	59.2	3.98
Monticello *	90	28	61.1	2.62
Mount Pleasant * †	84	38	61.0	5.42
Mount Vernon *	91	33	62.8	3.45
Muscatine (1) †	.....	.....	.....	4.25
Muscatine (2)	89	31	62.0	3.95
Oskaloosa (1) *	88	34	62.6	4.25
Sac City †	80	34	55.9	1.65
Storm Lake *	84	35	58.7	1.34
Vinton *	86	32	59.9	2.62
Washington *	93	32	65.5	7.19
Webster City	91	30	59.8	1.01
Wesley †	88	25	56.6	0.70
West Bend †	87	30	57.9	0.98
Kansas.				
Abilene	.....	.....	.....	2.45
Allison *	.....	47	62.0	1.70
Arlington	.....	.....	.....	4.40
Augusta *	94	40	68.7	3.36
Bendena †	79	46	63.0	1.62
Bucklin	.....	.....	.....	1.10
Buffalo Park *	96	40	.....	.....
Bunker Hill *	98	42	70.6	0.25
Burr Oak *	89	32	63.4	0.50
Carneiro *	92	42	.....	1.25
Cawker City *	92	40	66.8	0.50
Cold Water	.....	.....	.....	3.40
Collyer	102	50	74.1	1.00
Concordia	90	30	62.6	1.30
Conway	94	36	66.1	1.60
Cunningham *	96	36	64.8	2.72
Dorrance *	98	46	.....	0.15
Dwight	.....	.....	.....	3.25
Elco *	91	36	64.0	3.05
Elk Falls †	91	38	68.4	5.81
Ellis (1)	96	30	64.4	0.00
Ellis (2) *	92	50	.....	0.00
Ellsworth *	100	45	.....	0.20
Emporia	90	41*	63.5	7.00
Englewood *	94	37	66.7	1.19
Fort Hays *	99	33	66.5	0.56
Ft. Leavenworth (1)	90	34	64.3	5.26
Ft. Leavenworth (2)	88	39	64.0	6.06
Fort Riley	93	36	66.0	1.73

Meterological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Kansas—Cont'd.	°	°	°	*Ins.*
Fremont†	102	31	66.9	0.80
Gibson	100	30	64.6	0.90
Globe	88	41	63.3	4.20
Gognac				0.19
Gorham*	90	44		0.25
Grainfield*	99	50		0.50
Grinnell*	96	42	71.2	0.00
Halstead	90	35	66.5	2.79
Havensville*	98	37	63.3	2.12
Hays City*	95	45		T.
Horton*	90	41	64.4	1.60
Independence	98	41	66.2	7.29
Junction City				2.19
Kanopolis*	88	40		0.10
Kellogg	96	38	68.0	4.45
Kirwin†				0.30
La Harpe*		48	64.5	5.30
Lakin*	98	42	71.2	0.16
Larned*	96	34		
Lawrence	89	38	63.2	5.02
Lebo	95	33	62.0	3.53
Lincoln Centre*	99	38	66.1	
Lisbon*	100	38	68.3	0.06
Luray				0.00
Macksville*	95	30	66.9	
Manhattan (1)†				2.13
Manhattan (2)	101	30	63.2	1.92
Manhattan (3)*	92	32	62.7	2.03
Marmaton*	92	35		5.30
McAllaster*	98	28		0.50
McPherson				2.80
Minneapolis				0.47
Monument*	96	30		1.20
Morse*	82	34	60.4	4.85
Oakley*	102	44	68.9	0.90
Oberlin†				0.30
Offerle	97	35	64.2	1.02
Ogallah*	95	40		
Ottawa		34		3.95
Quinter*	94	38		0.65
Richfield*	96	32	71.8	0.22
Rome*	92	36		4.64
Russell*	90	38		0.00
Salina†				1.50
Santa Fé†	97	30	67.8	1.20
Scott City				0.00
Sedan	100	42	66.3	10.59
Seneca*	93	34	63.6	0.38
Sharon Springs*	92	36	63.9	0.00
Shields				0.00
Stockton				0.00
Stolzenbach*	88	32	63.0	0.70
Tribune†	96	28	64.0	0.07
Ulysses				0.16
Vesper*		29		1.49
Victoria*	96	39	68.9	T.
Wakefield				1.80
Wa Keeney*	92	46		0.05
Walker*	96	34		
Wallace†				0.05
Wellington	93	37	66.5	3.77
Weskan*	99	38	64.8	0.00
Wilson*	95	38		0.45
Winfield				5.85
Winona*	98	36		0.83
Yates Center	93a	34	64.0	5.15
Kentucky.				
Ashland†*		38	59.5	3.01
Bowling Green†	93	40	69.2	4.29
Burnside†				5.29
Canton†*	89	38	65.0	6.31
Catlettsburgh†				3.08
Earlington	88	38	67.4	4.86
Eddyville†				4.69
Falmouth (1)†				4.05
Falmouth (2)†*	86	40	61.8	3.31
Frankfort (2)	93	38	64.4	7.01
Franklin†*	92	47	68.6	3.53
Greensburgh†				3.30
Louisa†				5.20
Millersburgh†*	86	43	66.2	6.60
Mount Sterling†*	89	40	62.9	2.47
Murray	101	36	66.7	6.06
Newport Barracks	98	36	66.2	3.75
Owenton†	88a	39a	63.2a	4.52
Paducah†				5.69
Pellville†	97	37	68.8	4.23
Richmond†	85	44	65.6	5.32
Shelbyville†	92	36	64.4	7.29
South Fork†*	87	40	64.8	12.40
Springfield h	92	37	64.4	4.10
Williamsburgh†				5.77
Louisiana.				
Alexandria†	96	48	76.0	0.33
Amite City†	93	46	76.2	1.95
Cameron†	104	49	78.7	3.05
Cheneyville†	96	44	76.0	1.50
Clinton	93	50	74.3	2.40
Coushatta (1)				1.78
Coushatta (2)†	92	50	74.1	1.24
Crowley	92	52	76.0	1.35
Delhi†				2.00
Donaldsonville	92	52	75.7	0.94
Edgard	96	55	75.0	4.12
Emilie	93	53	77.2	2.75

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean.	Precip'n.
Louisiana—Cont'd.	°	°	°	*Ins.*
Farmerville	93	49	73.6	0.80
Franklinton	95	51	76.9	2.55
Girard†				2.25
Grand Cane h	91	50	73.3	4.70
Grand Coteau	92	52	76.4	2.13
Hammond	94	48	77.4	2.98
Houma†	92	52	76.2	6.80
Jackson Barracks	94	58	79.0	6.49
Jeanerette	93	58	77.6	2.93
La Fayette (2)†	93	50	76.7	1.11
Lake Charles	96	48	78.7	1.10
Liberty Hill	98	47	76.0	1.45
Luling	94	47	74.7	3.42
Mandeville	96	49	77.1	1.64
Marksville*†d	94	40	75.7	2.32
Maurepas	93	50	76.3	2.75
Melville†	95	54	77.2	0.70
Minden†	91	54	75.8	1.18
Monroe†	92	48	74.0	1.84
Natchitoches†	96	54	73.2	1.69
New Iberia ss	95	53	76.6	0.31
Plaquemine	97	54	76.2	2.82
Pointe à la Hache*†		65	79.6	5.75
Port Eads	90	62	80.2	2.10
Shell Beach	89	61	78.0	0.50
Sugar Ex. station	94	51	77.4	5.30
Thibodeaux				4.40
Trinity	90	55	75.8	1.70
Vidalia	100	48	78.5	0.40
Winnfield†*	89	57	75.0	1.69
Maine.				
Bar Harbor	84	37	60.6	1.65
Belfast*	77	45	59.9	
Calais	84	28	60.6	1.93
Cornish	83	36	61.1	4.16
Fairfield	83	30	59.1	1.95
Fort Preble				2.50
Gardiner	82	37	60.7	2.55
Kennebec Arsenal	82	37	58.8	0.21
Kent's Hill	81	35	60.2	3.42
Lewiston	84	34	60.8	2.92
Mayfield*	83	28	56.6	6.52
Orono†	84	32	60.5	2.21
Petit Menan*	71	40	55.8	
West Jonesport*	78	36	56.3	2.50
Maryland.				
Barren Creek Sp'gs†	87	40	66.0	3.79
Cumberland (1)	84	40	64.0	4.16
Fallston	80	43	63.3	8.65
Fort McHenry	82	44	66.1	4.96
Frederick	84	42	65.0	4.06
Gaithersburgh*		48	60.6	
Galena†*		52	65.5	4.63
Gambrills*		49	64.6	4.15
Jewell		49	66.7	5.25
McDonogh	81	44	63.3	6.49
Mt. St. Mary's Col†	85	38	64.0	6.45
Massachusetts.				
Amherst	82	32	61.0	4.26
Amherst Ex Sta (1)	82	34	60.9	2.90
Amherst Ex Sta (2)	79	40	61.9	3.17
Beverly Farm	74	39	59.3	3.84
Blue Hill (sum't)	80	38	59.7	5.13
Blue Hill (base)	80	39	61.8	4.89
Blue Hill (valley)	84	34	62.0	4.61
Brewster	82	43	63.8	2.94
Cambridge (1)	82	41	62.2	4.30
Cambridge (2)	84	42	63.2	5.30
Chestnut Hill	85	38	62.2	5.30
Chicopee				5.32
Clinton				5.35
Cotuit	79	41	63.1	3.03
Deerfield (2)*	84	37	63.2	
Dudley	84	41	61.3	4.02
Fall River (1)	80	42	62.6	4.92
Fiskdale				2.49
Fitchburg (1)*	82	40	60.2	3.35
Fitchburg (2)	82	35	60.9	3.77
Fort Warren	81	43	60.0	3.47
Framingham	83	37	62.4	4.24
Gilbertville	83	32	61.1	4.28
Groton	84	37	62.0	3.33
Heath	86	32	62.8	
Holyoke	88	40	64.0	4.64
Lake Cochituate	86	32	61.4	4.92
Lawrence	86	40	62.7	3.32
Leicester	78	36	59.1	3.51
Leominster				3.05
Long Plain*	80	42	64.6	3.68
Lowell (1)	82	40	62.4	3.26
Lowell (2)	84	37	62.2	
Lowell (3)	85	40	62.9	
Ludlow	82	30	60.2	4.04
Lynn	79	41	61.0	3.43
Mansfield	81	35	61.8	5.25
Medford				4.90
Middleborough	81	35	62.2	3.62
Milton*	81	40	60.6	4.87
Monson	83	35	60.4	2.72
Mount Nonotuck				4.84
Nahant	79	42	61.6	3.01
New Bedford (1)	78	41	61.5	3.93
New Bedford (2)	78	41	62.2	3.87
New Bedford (3)	79	39	62.9	4.12
Newburyport (1)	84	40	61.2	2.82

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Massachusetts—Con.	°	°	°	*Ins.*
Newburyport (2)				2.75
Northampton	89	40	64.6	5.16
North Billerica	84	38	62.8	3.14
Plymouth*	83	44	64.5	2.57
Princeton	80	33	59.3	3.32
Provincetown	81	41	63.8	2.20
Randolph				5.08
Royalston*	86	50	63.6	
Salem (1)*	84	45	64.0	
Salem (2)				2.80
Somerset*	87	36	65.8	3.74
Springfield Armr'y	82	40	63.6	4.28
Swampscott	77	37		2.85
Taunton (1)	86	39	62.0	3.02
Taunton (2)	83	38	62.4	3.69
Waltham				4.26
Wellesley	82	36	62.6	3.80
Westborough*	88	37	64.4	4.34
Williamstown	79	37	59.7	2.39
Winchester				4.61
Worcester (1)*	82	40	64.5	3.45
Worchester (2)	81	38	61.8	
Mexico.				
Guanajuato	79	48	64.4	11.88
La Logia*	95	66	80.4	9.19
Leon de Aldemas	82	52	67.7	12.94
Puebla	77	50	65.3	
Topo Chico*	88	62	78.0	6.92
Topolobampo	85	70	78.5	10.31
Michigan.				
Adamsville				1.75
Adrian	89	28	61.3	0.96
Albion (1)	86	32	61.4	1.07
Allegan				3.94
Alma	92	25	60.4	0.93
Ann Arbor	85	34	61.5	1.35
Arbela				0.75
Atlantic*	90	31	55.7	2.83
Ball Mountain				0.70
Bear Lake	88	29	60.1	3.74
Bell Branch*	88	34	61.6	0.95
Benton Harbor	91	34	66.2	3.80
Berrien Springs*	90	39	62.0	4.45
Big Rapids	88	26	59.6	2.72
Birmingham	91	31	59.9	1.20
Bronson			56.8	1.13
Buchanan	89	38	61.7	3.13
Calumet	82	37	54.6	3.86
Cassopolis	89	34	63.0	2.00
Charlevoix	88	35	59.6	5.19
Chase	88	31	57.6	3.19
Colon			57.1	1.33
Columbia*	90	40	63.1	0.99
Concord	89	30	61.2	0.74
Deer Lake	86	30	60.4	2.11
East Tawas	91	32	58.5	0.62
Evart	86	20	52.2	2.83
Fitchburgh				0.73
Flint	92	27	60.6	0.84
Fort Brady	80	31	56.8	4.93
Fort Mackinac	75	36	57.1	4.34
Fort Wayne	89	32	52.2	0.72
Fremont			60.3	1.69
Gladwin	90	21	58.6	1.61
Grand Rapids	86	31	61.5	2.34
Grape				1.69
Grayling	89	25	57.1	3.79
Hanover	88	32	61.7	1.32
Harrisville	84	25	56.4	2.02
Hart	90	20	64.4	2.55
Hastings	86	30	61.2	1.57
Hillman i	94	27	57.2	2.94
Hillsdale*	86	35	61.7	1.19
Highland Station	95	36	60.9	0.35
Hudson	85	25	58.4	1.06
Ionia	90	38	62.1	1.33
Ivan	88	32	53.8	4.17
Jeddo	94	32	65.4	1.39
Kalamazoo	87	34	62.4	1.90
Lansing	89	28	60.9	0.83
Lathrop	86	28	54.2	2.94
Madison	89	31	58.0	1.13
Marshall	93	28	61.4	0.67
Mayc	88	21	60.4	1.07
Montague	90	29	60.9	2.00
Mottville	92	25	62.0	0.91
Noble				2.60
North Adams	89	29	57.4	1.22
North Marshall	90	30	62.0	
Olivet	90	33	59.6	1.01
Otsego	88	32	60.7	
Ovid	88	27	60.6	0.76
Paw Paw	91	29	63.6	3.27
Pontiac	84	38	61.4	0.76
Pulaski			60.0	1.23
Rawsonville*	88	32	61.4	1.13
Romeo	90	33	61.9	1.00
Roscommon	86	26	56.4	4.12
Saint Ignace	78	32	56.5	4.50
Saint John's	90	32	62.5	0.97
Sand Beach	84	38	62.0	0.79
Standish	89	38	56.1	1.88
Stanton	88	26	60.5	1.71
Traverse City (1)	90	33	60.6	4.81
Traverse City (2)	89	34	60.9	4.81

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean.	Precip'n.
Michigan—Cont'd.	°	°	°	*Ins.*
Thornville	92	35	62.6	1.96
Vandalia			58.2	1.49
Vienna				4.20
Washington	89	33	60.8	1.04
Weldon Creek				2.09
West Branch	85	29	57.6	2.28
Williamstown	86	36	61.2	0.70
Ypsilanti (1)	89	29	59.3	1.79
Ypsilanti (2)	85*	34	60.8	0.69
Minnesota.				
Alexandria†				2.36
Brainard	83	33	54.2	1.85
Crookston*	92	30	53.8	
Farmington	82	34	58.8	0.82
Fergus Falls†				1.73
Fort Ripley†				0.52
Fort Snelling	90	29	60.0	0.82
Grand Meadow*	93	30	58.2	2.80
L. Winnibigoshish	86	34	52.6	2.85
Leech Lake	88	26	51.8	2.89
Le Sueur*d	83	33	58.6	0.54
Mankato	90	32	59.1	0.74
Minneapolis (1)*	91	37	58.2	0.82
Montevideo*†	92	32	57.3	2.07
Morris	89	30	56.0	1.98
Northfield	89	30	58.5	0.68
Ortonville†				2.43
Osseo*	88	35	56.6	1.65
Owatonna	88	26	57.6	1.50
Pine River	88	26	53.1	2.14
Pokegama Falls	85	21	50.4	2.71
Red Wing	90	32	57.8	1.45
Redwood Falls†				1.96
Rolling Green	86	29	56.3	0.87
Sheldon*		34	57.8	
Tracy†				2.06
Mississippi.				
Aberdeen†	90	40	68.8	2.35
Agricultural Col'ge	93	44	72.1	1.24
Batesville†	94	44	71.4	3.07
Brookhaven†	98	42	76.0	1.85
Canton*		51		0.81
Columbus†	100	44	74.6	
Corinth†	92	44	70.2	4.86
Edwards†	96	48	76.2	1.11
Fayette	95	49	75.5	0.32
Greenville	91	49	72.6	4.05
Hazlehurst†	98	44	75.6	0.19
Hernando†	91	45	72.4	2.30
Holly Springs (1)*	88	50	73.6	5.76
Holly Springs (2)†	92	46	70.9	0.60
Jackson†	96	44	75.2	0.27
Kosciusko *†	93	53	75.6	0.00
Lake†	94	40	73.0	0.98
Loch Leven	94	50	75.7	5.48
Logtown	94	51	73.9	4.01
Louisville†	102	39	74.2	0.95
Macon (2)†	96	40	72.4	0.37
Natchez†	97	45	75.1	0.43
Okalona†	96	42	72.4	0.60
Pearlington†	94	51	77.6	4.01
Port Gibson†	96	42	74.6	0.16
Pontotoc†	90	43	69.4	1.39
Rienzi*	90	48	72.6	3.69
Ripley†		44	67.2	3.00
Water Valley*	98	48	73.6	1.54
Waynesboro' (1)†	92	44	73.0	5.08
Waynesboro' (2)†	94	42	74.2	4.06
Yazoo City†				1.53
Missouri.				
Boonville†				6.58
Carthage†				2.68
Conception	87	39	66.1	4.18
Excelsior Springs*	89	32	61.6	5.58
Fayette†	89	33		7.34
Frankford (1)*	78	21	59.8	6.37
Glasgow	87	32	63.8	9.28
Grand Pass	87	35	63.5	6.66
Harrisonville *	89	33	60.8	7.36
Hermann†				5.89
Ironton*	90	44	66.4	3.59
Jefferson Barracks	92	33	66.6	2.91
Jeromet				0.28?
Kansas City	93	36	65.7	7.73
Lamont*	98	32	69.2	4.20
Louisiana Bridge†				4.23
New Frankfort*	86	36	62.2	2.87
New Haven*	88	48	70.0	6.62
Oak Ridge*	90	40	61.2	3.35
Ozark*	87	33	66.2	4.70
Princeton*	86	38	65.9	3.40
Saint Charles (1)				4.00
Saint Charles (2)	84	38	63.5	4.37
Saint Joseph†				3.19
Sedalia	94	35	66.0	6.27
Shelbina				4.60
Steelville	89	32	60.8	2.44
Warrensburgh*	84	40	63.3	4.44
Willow Springs†	93	32	67.6	6.54
Wither's Mill				6.00
Montana.				
Camp Poplar River	90	27	53.5	1.19
Custer†				0.00
Fort Assiniboine	88	22	56.5	0.65
Fort Custer	86	30	55.4	0.51

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Montana—Cont'd.	°	°	°	*Ins.*
Fort Keogh	87	29	54.9	1.06
Fort Logan †	82	16	49.3	0.81
Fort Maginnis	88	24	64.5	1.43
Fort Missoula	82	20	52.0	0.33
Fort Shaw	90	26	55.2	0.35
Galpin †	.....	.....	.....	0.90
Glendive †	89	31	55.8	2.95
Kintyre	.....	.....	.....	1.25
Powder River †	90	29	55.5	0.90
Sheldon *	80	32	51.8	1.00
Virginia City	79	28	51.3	0.29
Nebraska.				
Alliance †	93	33	59.6	1.56
Ansley †	91	31	59.8	0.40
Ashland	92	33	63.5	2.06
Bingham †	93	28	56.0	1.75
Craig	83	36	61.2	1.61
Creighton †	101	32	57.5	3.70
Crete	91	34	61.3	1.97
Culbertson (1) †	.....	.....	.....	0.85
Culbertson (2) *	98	30	59.1	0.83
De Soto *	87	33	62.1	0.85
Fairbury	86	.....	.....	2.46
Falls City †	94	34	63.9	1.12
Fort Niobrara	98	26	58.0	1.39
Fort Omaha	87	35	62.7	1.79
Fort Robinson	97	24	58.3	0.38
Fort Sidney	100	25	59.7	0.00
Fremont*e	86	39	65.3	1.40
Genoa †	88	36	60.6	1.76
Gering †	96*	32	60.7	0.21
Grand Island	82	38	57.5	0.87
Hay Springs	95	24	54.6	0.64
Holmesville *	98	40	66.1	1.35
Howe	89	32	65.5	1.08
Kennedy † *	96	36	58.9	1.28
Marquette (1)*	89	38	.....	3.72
Nebraska City	.....	.....	.....	1.22
North Loup †	87*	31	58.1	1.60
Oakdale	89	29	57.3	1.47
Plattsmouth †	.....	.....	.....	2.90
Syracuse *	89	37	64.7	1.03
Tecumseh †	82	39	64.1	1.50
Weeping Water*	89	31	60.8	2.49
Weston	89	37	63.2	1.84
West Point	86	.....	.....	.....
Nevada.				
Belmont	82	35	62.0	0.01
Beowawe (1) *	90	40	63.6	0.00
Brown's *	100	45	69.7	0.00
Burner's Ranch	.....	.....	.....	T.
Candelaria	85	37	64.4	T.
Carlin*	90	30	58.3	0.10
Carson City	92	26	60.8	0.00
Crane's Ranch	.....	.....	.....	0.11
Downeyville	92	42	69.0	0.00
El Dorado	110	60	84.4	0.48
Elko (1) *	85	28	53.7	0.03
Elko (2)	94	13	54.2	0.00
Ely	81	23	54.2	0.50
Eureka	89	24	58.9	T.
Fenelon*	100	38	64.0	0.05
Ferguson's Ranch	92	30	61.2	0.00
Genoa	88	29	62.1	0.00
Golconda *	92	38	65.5	0.00
Halleck *	91	30	57.0	0.00
Hawthorne (1) *	90	48	63.8	0.82
Hawthorne (2)	92	38	66.0	0.70
Hot Springs (1) *	95	32	62.4	0.00
Humboldt (1) *	90	46	62.1	0.00
Humboldt (2)	90	40	60.2	0.00
Lewer's Ranch	90	33	64.4	0.00
Mill City	94	40	56.2	0.00
Palisade	88	39	62.5	0.05
Pioche	.....	.....	.....	2.00
Punch Bowl	77	29	56.9	0.00
Reno *	88	34	61.3	0.00
Reno State Univ'y	91	35	57.8	0.00
Ruby Hill	73	21	50.8	0.00
Saint Clair	90	30	60.8	0.00
Sodaville	97	35	68.2	0.00
Tecoma*	88	38	63.6	0.30
Toano *	88	32	61.5	0.37
Tuscarora	80	25	54.2	0.00
Verdi	93	37	63.1	0.00
Virginia City	85	38	65.6	0.00
Wadsworth *	93	38	66.5	0.00
Wells *	95	20	57.5	.....
Winnemucca *	86	40	60.0	0.00
Yount's Ranch	96	48	72.9	0.30
New Hampshire.				
Antrim	.....	.....	.....	3.04
Belmont	.....	.....	.....	6.29
Berlin Falls	83	26	55.4	.....
Berlin Mills	88	40	62.4	5.84
Bristol	.....	.....	.....	4.42
Concord	82	37	61.1	3.80
Hanover (1)	79	36	58.7	3.52
Hanover (2)	88	33	58.2	3.58
Lake Village	.....	.....	.....	5.29
Manchester (1)	84	35	61.5	3.92
Manchester (2)	88	36	62.3	4.34
Mine Falls	.....	.....	.....	3.11
Nashua *	85	36	61.3	3.34
Newton	84	36	60.9	4.23

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
N. Hampshire—Con.	°	°	°	*Ins.*
North Chesterfield	81	25	57.1	5.92
North Conway	85	34	59.5	3.43
North Sutton *	.....	40	57.9	3.71
Pennichuck Sta	.....	.....	.....	2.92
Plymouth	88	36	59.8	4.63
Shaker Village	81	32	59.4	3.49
Stratford	90	32	61.0	6.52
Walpole	78	34	58.0	3.47
West Milan	84	31	55.6	4.66
Weir's Bridge	.....	.....	.....	5.11
Wolfborough	.....	.....	.....	3.86
New Jersey.				
Allaire	89	35	63.6	.....
Asbury Park †	80	43	60.6	6.18
Beverly †	88	41	64.0	8.22
Billingsport L. H*	86	47	65.6	.....
Bridgeton*	85	48	67.0	3.97
Cape May C. H.	89	46	65.8	.....
Egg Harbor City	83	40	63.7	10.73
Freehold	86	41	63.8	10.63
Gillette	87	40	63.1	9.94
Hanover	83	34	60.4	9.24
Highland Park	87	41	64.0	7.49
Hopewell	.....	.....	.....	10.90
Imlaystown*	89	42	64.0	11.29
Jersey City	84*g*	46*g*	64.0*g*	.....
Lambertville *	88	43	65.2	10.84
Locktown	85	39	63.9	7.97
Madison	90	39	63.0	9.70
Moorestown *	84	44	63.7	6.10
Newark	81	45	64.4	8.23
New Brunswick (1)	84	47	.....	7.83
New Brunswick (2)	86	43	65.3	8.63
New Brunswick (3)	85	41	64.1	.....
Ocean City*	83	50	66.9	6.80
Oceanic	85	45	66.2	8.76
Plainfield	90	38	63.7	13.13
Princeton	85	46	64.4	8.59
Rancocas	.....	.....	.....	6.37
Readington *	88	50	67.8	.....
Tenafly	89	37	63.4	11.31
Trenton *	88	46	67.0	10.13
Union *	81	45	63.0	9.68
Valley	.....	.....	.....	6.45
Woodbury	86	44	66.1	6.81
New Mexico.				
Albuquerque †	89	35	66.0	0.18
Coolidge	93	25	59.0	0.90
Deming *	100	48	74.3	3.55
Eddy	.....	.....	.....	2.11
Fort Bayard	89	37	64.5	2.19
Fort Marcy	87	27	60.0	0.72
Fort Selden	104	39	70.2	1.62
Fort Stanton	88	32	59.8	2.65
Fort Union	81	24	53.6	0.58
Gallinas Spring †	89	37	68.4	0.45
Hillsborough †	91	39	65.4	3.93
Las Vegas †	89	28*	56.2	0.80
Lordsburg*	95	46	73.1	1.76
Nogal	.....	.....	.....	3.54
Red Cañon	.....	.....	.....	1.57
Springer †	.....	.....	.....	0.50
New York.				
Alfred Centre	80	34	57.8	1.82
Angelica †	84	30	58.1	2.34
Ardenia *	83	48	63.8	5.61
Auburn	80	39	60.7	4.10
Boyd's Corners *	86	41	64.1	6.13
Canton †	84	34	57.8	2.67
Constableville † *	83	33	56.5	3.15
Cooperstown *	80	36	58.7	3.87
Davids Island	83	42	64.4	4.78
Eden*	90	44	64.0	7.62
Elmira † *	84	40	63.3	1.97
Factoryville †	83	34	59.8	3.30
Fleming *	98	44	60.6	.....
Fort Columbus	83	49	66.7	6.37
Fort Hamilton	79	48	65.3	4.36
Fort Niagara	90	42	64.1	2.14
Fort Porter	86	39	62.7	4.27
Fort Schuyler	80	47	65.2	8.21
Fort Wadsworth	83	45	65.5	7.08
Geneva	86*k*	43*k*	66.3*k*	3.05
Hess Road Sta †	88	33	60.2	6.68
Honeymead Brook*	86	36	63.0	4.47
Humphrey * †	89	37	60.4	3.12
Ilion †	86	33	59.7	3.42
Ithaca	84	38	60.6	2.57
Kingston † *	92	34	63.8	4.23
Lyons	84	40	61.4	2.72
Madison Barracks	90	35	61.2	3.08
Middleburgh †	88	36	60.7	3.00
Newfane Station *	.....	44	61.9	.....
Nineveh *	90	38	61.8	5.35
North Hammond † *	90	42	61.3	2.48
Number Four †	80	27	55.9	3.65
Palermo †	83	31	60.1	2.70
Palmyra *	88	40	62.6	.....
Pendleton Centre *	.....	45	59.7	.....
Perry City *	85	34	58.2	3.54
Plattsburgh B'ks	83	35	60.6	4.25
Queensbury * †	.....	35	57.0	3.13
Rome	88	32	61.1	3.97
Saranac Lake †	84	32	56.2	3.69
Savona †	85	32	59.5	2.25

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
New York—Cont'd.	°	°	°	*Ins.*
Schenectady	87	42	64.8	.....
Setauket	81	48	64.3	7.22
South Canisteo *	82	35	58.5	4.57
South Kortright * †	.....	33	57.6	3.80
Tannersville †	78	33	56.4	8.03
Turin *	.....	44	58.7	3.61
Utica	91	32	60.7	3.67
Watervleit Arsenal	83	37	61.9	5.00
Wedgewood*	86	40	60.4	2.34
West Point	84	40	62.4	6.42
White Plains *	78	44	62.9	4.35
Willet's Point	81	45	64.7	7.16
North Carolina.				
Asheville (1) †	.....	.....	.....	3.89
Asheville (2)	82	36	63.9	4.28
Charleston †	.....	.....	.....	3.56
Goldsborough †	88	46	69.9	3.30
Grover *	.....	46	74.8	0.35
Lenoir *	83	40	65.8	5.30
Lumberton †	90	44	70.8	1.58
Mount Holly †	.....	.....	.....	3.44
Mount Pleasant	88	38	67.5	3.95
Murphy †	.....	.....	.....	3.93
New Berne †	86	42	69.5	2.71
Raleigh	90	47	72.0	1.70
Soapstone Mount *	.....	40	66.8	4.12
Wadesborough †	88	44	69.8	0.85
Weldon (1) †	87	42	67.6	3.26
Ohio.				
Akron	96	40	62.0	4.42
Ashland*	88	42	61.1	3.10
Athens	92	34	61.9	3.43
Bangorville	89	34	61.3	3.52
Bellevue *	86	38	61.2	1.76
Bement	80	45	62.0	.....
Bucyrus	92	36	63.2	.....
Caledonia †	.....	.....	.....	3.81
Canton	89	38	.....	3.73
Carrollton	.....	.....	62.6	3.10
Celina	90	37	63.3	2.82
Circleville (1) †	.....	.....	.....	4.46
Circleville (2)	.....	.....	.....	5.33
Clarksville	95	34	62.2	4.98
Cleveland	88	43	62.4	5.10
College Hill *	92	42	67.1	5.85
Collinwood	.....	.....	.....	4.35
Columbus Barracks	97	34	64.4	3.76
Dayton	93	33	65.0	2.06
Demos *	88	36	61.2	3.52
Ellsworth	.....	.....	.....	4.04
Elyria *	90	40	62.6	4.20
Findlay	90	30	61.4	2.70
Garrettsville *	89	34	59.7	5.18
Georgetown	98	38	65.1	7.12
Granville	92	36	62.3	3.91
Gratiot *	93	38	64.5	4.58
Greenville	88	35	61.1	3.66
Hanging Rock	92	35	62.1	3.62
Hiram	90	39	60.0	5.61
Hudson	.....	.....	.....	5.87
Jacksonborough *	90	36	64.0	2.43
Jefferson	91	36	60.5	4.33
Kent *	91	33	62.0	5.72
Kenton *	92	36	62.1	2.41
Leipsic *	92	40	63.6	.....
Logan	96	39	.....	3.30
Lordstown	90	34	61.3	2.65
Mansfield †	.....	.....	.....	4.03
Marietta (1) †	.....	.....	.....	2.78
Marietta (2)	90	39	64.7	3.18
McConnelsville	93	36	64.6	3.82
Napoleon †	88	33	62.2	1.70
New Alexandria	89	39	63.7	2.47
New Athens †	92	40	65.1	3.50
New Comerstown	91	37	61.0	4.55
North Lewisburgh	94	36	64.3	3.75
Oberlin	87	40	63.0	4.46
O. S. University	93	31	62.6	3.77
Orangeville *	.....	34	57.9	3.80
Ottawa	.....	.....	.....	1.66
Poland *	.....	40	57.4	4.48
Pomeroy	92	38	67.0	3.66
Portsmouth (1) †	.....	.....	.....	3.47
Portsmouth (2)	89	40	63.8	3.49
Shanesville *	91	41	64.4	.....
Shiloh *	90	33	59.6	3.00
Sidney	90	31	63.0	4.48
Springborough	.....	.....	.....	2.53
Tiffin *	89	40	63.4	2.00
Upper Sandusky	89	35	62.1	2.68
Vienna *	90	39	61.6	3.15
Wapakoneta	92	31	65.6	1.80
Wauseon	90	28	61.0	0.79
Waverly	91	37	65.8	4.66
Westerville	90	34	60.6	3.21
West Milton*	95	37	68.1	4.05
Weymouth	.....	.....	.....	4.14
Wooster	92	37	60.8	4.05
Yellow Springs	89	33	62.7	2.27
Youngstown	90	36	63.8	4.25
Zanesville †	.....	.....	.....	3.27
Oregon.				
Albany † *	97	32	61.6	1.74
Ashland *	89	39	62.1	0.00

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Oregon—Cont'd.	°	°	°	*Ins.*
Banion *	80	36	55.4	1.60
Beulah †	93	24	60.8	T.
Cascade Locks	82	59	.....	4.95
Creswell	88	29	62.0	1.33
East Portland	87	40	.....	0.68
Eola *	91	46	61.2	1.80
Gardiner	.....	.....	.....	2.92
Grant's Pass †	98	29	61.2	0.04
Heppner †	91	31	58.4	0.16
Hood River	84	42	60.4	1.39
Jacksonville	95	38	63.5	0.00
La Grande	84	28	57.4	0.46
McMinnville †	95	29	60.0	2.40
Mount Angel †	90	35	62.0	2.16
Nolin	92	32	56.3	0.59
Parkers	.....	.....	.....	0.00
Saint Helens	88	34	61.0	2.40
Siskiyou *	92	40	64.1	0.00
Telocaset	.....	.....	.....	0.17
Tillamook †	93	34	57.3	7.51
The Dalles	86	35	60.9	0.16
Vernonia	88	30	57.0	.....
Pennsylvania.				
Allegheny Arsenal	94	40	66.1	2.79
Altoona	86	41	64.4	2.74
Annville	91	50	68.7	.....
Bethlehem	83	40	64.0	6.14
Blooming Grove *	83	40	60.0	8.30
Blue Knob *	86	38	60.6	4.70
Brookville †	.....	.....	.....	3.40
Cannonsburgh	88	36	62.5	3.41
Catawissa	80	39	63.3	4.47
Chambersburgh	86	34	62.9	4.13
Clarion (1) †	.....	.....	.....	3.51
Clarion (2)	86	31	61.8	3.32
Coatesville	88	37	62.9	9.12
Confluence †	.....	.....	.....	1.90
Corry	92	31	61.0	5.25
Coudersport	88	31	60.5	2.90
Doylestown	.....	.....	.....	8.61
Drifton †	84	44	64.2	4.77
Dyberry †	82	31	57.2	4.18
Eagle's Mere	74	36	58.2	9.35
Easton	.....	.....	.....	6.40
Edinborough *	85	36	60.3	.....
Emporium	84	35	62.9	2.84
F'ks of Neshaminy *	82	48	61.9	8.76
Franklin *	84	34	59.4	4.39
Frankford Arsenal	86	42	66.1	7.40
Frederick	.....	.....	.....	6.68
Freeport †	.....	.....	.....	4.19
Germantown	84	48	64.8	5.51
Gettysburgh †	.....	.....	.....	6.81
Girardville	80	37	61.3	6.50
Grampian Hills	86	32	60.4	2.76
Greensborough †	.....	.....	.....	3.04
Greenville	90	34	59.3	3.68
Hollidaysburgh	87	32	62.0	3.01
Honesdale	80	34	60.1	5.90
Huntingdon	87	35	62.6	4.53
Indiana	88	35	61.7	4.60
Johnstown	85	42	62.8	4.59
Kennett Square	.....	.....	62.8	10.01
Lancaster	87	39	62.8	6.38
Lansdale	.....	.....	.....	8.32
Le Roy*	84	37	60.0	3.13
Lock Haven	87	36	62.9	4.73
Lock No. 4 †	.....	.....	.....	5.01
Mahoning †	.....	.....	.....	1.88
Meadville (1) † *	84	.....	.....	7.02
Meshoppen † *	.....	45	64.0	2.25
Myerstown	88	36	61.9	3.45
New Bloomfield	88	34	61.3	5.02
New Castle	90	31	63.1	4.01
Nisbet *	.....	42	61.5	3.40
Oil City †	.....	.....	.....	3.43
Ottsville	.....	.....	.....	7.38
Parker's Landing †	.....	.....	.....	3.79
Petersburgh	90	31	61.1	3.57
Philadelphia	.....	.....	.....	5.27
Philipsburgh †	85	35	59.8	2.91
Pleasant Mount *	.....	42	59.2	3.40
Point Pleasant	.....	.....	.....	8.14
Pottstown	88	41	65.0	8.44
Quakertown	84	37	61.6	8.06
Reading †	84	42	63.5	7.08
Rimersburgh	87	40	61.9	.....
Salem Corners	78	40	58.3	5.50
Saltsburgh †	.....	.....	.....	3.93
Seisholtzville	.....	.....	.....	7.32
Selin's Grove	84	41	63.1	5.16
Smith's Corners	.....	.....	.....	8.07
Somerset	88	32	57.0	2.94
South Eaton	80	32	57.5	3.32
State College	81	36	60.6	3.67
Swarthmore	85	41	63.8	8.04
Troy *	85	35	61.4	3.22
Uniontown	89	38	64.9	3.79
Warren †	.....	.....	.....	3.67
Wellsborough *	88	30	58.8	2.71
West Chester	84	42	63.6	9.95
Wilkes Barre *f*	82	37	60.5	5.79
Wysox	86	32	60.2	3.21
York	85	38	63.4	6.87

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Rhode Island.	°	°	°	*Ins.*
Bristol	79	44	64.4	4.41
Fort Adams	86	38	62.4	3.56
Kingston (1)	80	36	61.6	4.01
Kingston (2)	81	35	61.8	5.52
Lonsdale	.....	.....	.....	4.48
Newport	76	46	63.6	.....
Olneyville	86	43	65.7	.....
Pawtucket	.....	.....	.....	4.78
Providence (2)	82	39	63.9	5.03
Woonsocket	82	38	62.1	4.67
South Carolina.				
Allendale †	92	44	74.0	2.81
Batesburgh †	92	42	70.8	2.90
Belmont	89	46	67.5	2.66
Blackville †	92	46	74.0	3.52
Branchville †	90	42	73.4	1.88
Brewer Mine	94	44	69.0	2.58
Cedar Springs †	88	40	67.3	5.30
Cheraw †	94	44	71.4	3.95
Chester †	98	42	73.1	1.91
Clinton	85	42	63.5	3.72
Conway	87	49	68.0	5.55
Florence †	90	48	73.0	1.46
Greenville †	88	42	69.6	5.56
Greenwood †	90	48	72.4	3.01
Hardeeville †	92	48	74.8	6.87
Jacksonborough †	92	44	73.2	2.86
Kingstree †	92	42	72.6	3.51
Kirkwood *	.....	45	67.4	4.03
Port Royal †*	90	59	75.7	2.00
Saint Georges †	92	44	72.8	3.83
Saint Matthews †	92	46	73.2	2.59
Simpsonville	89	42	70.7	4.10
Spartanburgh (2) †	90	38	68.0	3.66
Statesburgh †	86	49	70.9	3.23
Timmonsville	84	57	70.5	2.07
Trial	92	45	68.0	3.26
Walhalla	85	42	63.5	7.37
Winnsborough	90	44	67.0	2.78
Yorkville	92	44	68.0	3.31
Tennessee.				
Andersonville	86	41	65.2	8.58
Arlington †	92	46	68.4	2.70
Ashwood †	87	41	67.9	4.87
Austin †	90	40	69.7	3.59
Bolivar (1)	95	49	75.0	7.10
Bolivar (2) †	94	42	70.3	4.65
Brownsville †	92	52	73.0	4.28
Carthage † *f*	.....	.....	.....	1.73
Charleston †	.....	.....	.....	7.37
Clarksville	89	41	67.8	5.29
Clinton †	.....	.....	.....	9.91
Cog Hill	88	46	72.5	3.70
Columbia †	.....	.....	.....	3.79
Covington (1)	87	51	69.0	5.69
Covington (2) †	90	46	68.2	4.50
Dunlap	90	45	69.3	8.69
Dyersburgh †	94	44	69.0	6.64
Fayetteville	91	44	70.0	4.47
Florence Station	86	44	67.2	4.54
Fostoria	88	42	62.6	7.60
Grand Junction †	91	46	70.9	6.90
Greeneville	83	41	64.3	2.06
Grief	90	43	69.0	8.60
Hohenwald	90	38	63.9	6.25
Jacksborough	86	38	65.0	7.64
Johnsonville †	.....	.....	.....	8.34
Kingston (1) †	.....	.....	.....	9.63
Kingston Springs	87	37	65.5	8.22
Lawrenceburgh	88	34	63.4	4.85
Leeville	95	43	69.7	3.88
Lewisburgh	90	42	67.0	3.86
Lookout Mountain †	88	45	66.8	5.58
Loudon †	.....	.....	.....	8.30
Lynnville	86	36	64.5	5.36
McKenzie	91	46	71.6	4.25
McMinnville	87	43	65.4	4.49
Milan (1)	91	44	67.4	4.85
Milan (2) †	94	40	69.2	4.71
Nunnelly	90	38	65.9	7.64
Parksville	88	42	67.1	3.31
Riddleton	89	37	66.6	4.93
Rockwood †	.....	.....	.....	7.43
Rogersville	90	43	66.3	3.39
Rugby	85	42	63.7	6.43
Savannah	92	46	68.2	5.77
Springdale	94	41	65.9	6.47
Strawberry Plains †	.....	.....	.....	6.17
Trenton	86	43	66.3	6.43
Tullahoma	85	49	63.9	1.85
Watkins	94	46	71.2	4.58
Waynesborough	90	42	67.0	4.75
Woodstock	92	50	70.0	3.95
Texas.				
Austin (1)	92	51	75.8	6.12
Austin (2) *	90	58	.....	.....
Belton †	94	53	74.4	5.40
Brady †	93	46	68.6	5.92
Brasoria †	88*	55	74.5	9.53
Brenham †	94	56	76.1	5.83
Brownwood †	93*	42	71.3	5.20
Camp Eagle Pass	99	50	75.3	5.33
C'p Peña Colorado	92f	33	68.6f	3.45
Cleburne	86	42	68.8	1.87
Coldwater †	.....	.....	.....	0.50

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Texas—Cont'd.	°	°	°	*Ins.*
College Station	94	57	76.1	14.86
Columbia Station †	90	54	76.6	7.23
Corsicana (1)	.....	.....	.....	5.33
Corsicana (2) †	92	52	73.2	7.02
Cuero †	94	302	71.8	6.99
Dallas (2) †	94	50	74.8	6.09
Decatur †	94	46	69.4	9.50
Duval *	94	52	71.2	6.60
Edinburgh †	.....	.....	.....	4.50
Epworth †	89*	52	72.0	0.45
Forestburgh	.....	64*	73.3	12.25
Fort Bliss	101	41	71.7	2.07
Fort Brown	92	55	77.4	7.44
Fort Clark	96	46	72.0	6.27
Fort Davis	90	33	65.5	3.51
Fort Elliott	95	41	68.3	1.85
Fort Hancock	97	23	65.5	1.91
Fort McIntosh	97	49	75.7	7.36
Fort Ringgold	99	49	77.2	2.52
Fort Worth †	91	47	72.9	3.72
Fredericksburgh *†	92	52	69.6	5.84
Gainesville *†	89	44	70.5	15.43
Gallinas †	96	51	72.9	5.75
Graham †	97	41	69.8	10.74
Granbury †	90	50	73.2	6.17
Hartley	102	32	73.9	0.50
Hearne †	90	52	72.6	6.15
Houston †	92	54	75.7	6.33
Howe *†	93	47	69.8	10.05
Huntsville †	98	51	75.6	2.67
La Grange †	.....	52	74.6	6.50
Lampasas † d	91	50	73.0	3.16
Longview †	96	52	74.1	4.71
Luling †	94	54	75.3	5.56
Menardville *†	93	50	68.2	4.54
Merkel † *	.....	44	67.7	3.91
Mesquite †	94	44	73.0	5.22
Miami †	.....	.....	.....	0.50
Navasota † m	87*	.....	78.6	4.53
New Braunfels †	90*	54	73.5	7.96
New Ulm	92	54	74.6	4.35
Orange †	90	70	81.4	2.60
Panhandle †	95	36	65.0	0.45
Paris †	96	50	72.6	6.85
Pecos City † *	90	55	68.6	0.76
Round Rocks † *	96	56	74.7	6.60
San Antonio	100	302	69.9	4.45
Silver Falls †	96	38	70.7	1.50
Snyder † *	.....	52	64.0	6.50
Tyler †	94	50	73.8	4.85
Waco (1) *	89	54	69.2	5.30
Waco (2) †	94	50	74.0	4.95
Utah.				
Alta	.....	.....	.....	0.00
Beaver †	87	47	59.8	0.40
Bingham †	.....	.....	.....	0.25
Corinne *	90	38	62.4	0.40
Fort Douglas	87	32	61.5	0.52
Fort DuChesne	91	27	58.1	0.34
Kelton *	87	44	60.9	0.00
Levan	.....	.....	.....	0.92
Loseé †	89	38*	58.4	0.40
Moab †	.....	.....	.....	0.02
Mount Carmel *	86	32	55.7	0.34
Mount Pleasant †	69	25	45.2	0.55
Nephi †	91	25	59.5	0.40
Ogden (1) *	82	32	59.3	0.65
Ogden (2)	.....	.....	.....	0.56
Park City	.....	.....	.....	0.00
Price †	.....	.....	.....	0.80
Promontory *	86	40	60.0	0.44
Provo City	.....	.....	.....	0.50
Richfield †	87	26	57.8	.....
Saint George †	102	46	72.8	1.26
Stockton	.....	.....	.....	0.13
Terrace *	85	48	64.8	0.00
Vermont.				
Brattleborough (1)	84	32	66.4	3.87
Brattleborough (2)	82	33	60.4	.....
Burlington	82	38	68.1	4.82
Chelsea *	75	35	55.4	4.95
Cornwall	.....	.....	.....	3.50
East Berkshire †	88	27	58.8	6.30
Hartland	84	35	60.0	3.79
Jacksonville	84	29	58.4	3.05
Lunenburgh *	83	32	61.1	5.17
Manchester *	82	42	60.5	5.77
Saint Johnsbury *	80	31	56.0	5.77
Strafford *	80	34	61.1	5.00
Vernon	82	36	61.7	5.58
Weathersfield Cen.	80	17	51.0	.....
Virginia.				
Abingdon †	.....	.....	.....	3.18
Birdsnest *	87	48	68.2	0.70
Bolar *	80	32	57.6	8.60
Christiansburgh †	84	33	62.7	4.01
Dale Enterprise †	87	38	66.2	6.70
Fort Monroe	86	42	68.2	4.40
Fort Myer	86	40	64.5	3.47
Lexington †	86	32	66.9	4.88
Middletown †*	88	40	60.0	1.92
Mossingford †	.....	.....	.....	5.50
Nottaway C. H	92	36	70.9	5.47
Petersburgh †	84	43	66.6	6.74
Richmond †	89	41	67.5	5.60

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Virginia—Cont'd.	°	°	°	*Ins.*
Smithfield *	85	43	66.8	4.29
Spottsville *	90	42	66.2	5.50
Summit	85	34	63.0	.....
University of Va.	.....	.....	.....	9.60
Woodstock †	.....	.....	.....	3.07
Wytheville	.....	.....	.....	3.35
Washington Territory				
Blakeley †	80	36	56.7	5.24
Fort Canby	90	40	61.2	5.32
Fort Spokane	91	25	58.9	0.27
Fort Townsend	78	35	55.5	0.75
Fort Walla Walla	90	34	63.0	0.26
Vancouver B'ks	90	34	60.4	1.60
Vashon	88	42	61.4	3.11
West Virginia.				
Buckhannon †	.....	.....	.....	3.52
Charleston †	.....	.....	.....	5.69
Clarksburgh †	86	30	66.7	3.24
Elin *	83	40	62.0	0.69
Glenville †	.....	.....	.....	4.89
Harper's Ferry †	.....	.....	.....	5.94
Hinton †	.....	.....	.....	4.18
Kingwood *	93	36	60.7	.....
Morgantown †	.....	.....	.....	3.91
Pleasant Hill *	84	38	60.0	.....
Point Pleasant †	.....	.....	.....	2.71
Rowlesburgh (1) †	.....	.....	.....	2.86
Rowlesburgh (2)	.....	.....	61.3	2.70
Seven Pines	89	34	63.8	.....
Tyler Creek *	86	40	65.1	3.32
Weston †	.....	.....	.....	4.16
Wheeling †	.....	.....	.....	2.65
White Sul'r Sp's †	.....	.....	.....	5.15
Wisconsin.				
Cadiz *	.....	30	57.6	.....
Chippewa Falls †	.....	.....	.....	1.95

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Wisconsin—Cont'd.	°	°	°	*Ins.*
Embarrass *	86	35	60.9	2.75
Fond du Lac	88	28	59.6	4.79
Friendship *	.....	32	58.2	2.62
Glasgow †‡	.....	35	57.4	2.83
Grantsburgh †	86	31	57.8	4.01
Greenwood †	86	21	52.4	3.01
Haywood † *	88	40	62.6	2.20
Honey Creek	90	38	63.2	0.25
Lincoln *	.....	42	61.4	3.25
Madison	90	35	61.2	1.93
Manitowoc	80	31	59.7	2.51
Medford †	.....	.....	.....	2.78
Neillsville *	96	22	56.5	.....
Phillips †	.....	.....	.....	1.33
Portage †	.....	.....	.....	1.18
Richland Centre *†	.....	38	58.8	2.57
Summit Lake *†	90	30	55.2	3.40
Viroqua *	.....	28	56.9	4.79
Wausau †	88	24	57.8	0.57
Wauseka *	100	30	61.3	T.
Wyoming.				
Bordeaux	.....	.....	.....	0.29
Camp Pilot Butte	85	24	54.8	0.05
Camp Sheridan	79	23	49.6	0.59
Carter †	.....	.....	.....	0.40
Fort Bridger	84	24	53.3	0.28
Fort D. A. Russell	92	22	53.3	0.17
Fort Laramie	97	29	57.2	0.00
Fort McKinney	83	31	55.5	0.07
Fort Washakie	79	27	52.9	0.14
Lusk †	87	27	54.5	0.02
Wheatland †	62	.....	.....	0.21
West Indies.				
Grand Turk Island	85	82	83.8	3.68
Hamilton, Bermuda	83	68	77.7	4.69
Havana, Cuba	96	72	81.7	4.43

Reports received too late for publication in August.

Stations.				
Alaska.				
Killisnoo	70	40	52.9	6.40
Arizona.				
American Flag	.....	.....	.....	3.16
Arizona Dam	.....	.....	.....	1.70
Calabasas	.....	.....	.....	2.48
Cottonwood	.....	.....	.....	1.10
Crittenden	.....	.....	.....	2.32
Duncan	.....	.....	.....	1.02
Fairbank	.....	.....	.....	2.57
Florence	110	70	88.4	0.53
Gillette	.....	.....	.....	1.05
Mayer	.....	.....	.....	2.59
Payson	.....	.....	.....	0.50
Peoria	112	54	84.8	T.
Red Rock	.....	.....	.....	1.99
Show Low	.....	.....	.....	0.60
Silver King	.....	.....	.....	2.78
Simmons	.....	.....	.....	0.27
Stanton	.....	.....	.....	3.73
Texas Hill *	119	86	101.1	0.00
Total Wreck	.....	.....	.....	2.01
Tres Alamos	.....	.....	.....	2.02
Tuba	.....	.....	.....	0.00
Walnut Grove	.....	.....	.....	1.65
Wilcox *	103	65	83.4	1.01
Woodruff	.....	.....	.....	0.28
Arkansas.				
Malvern	.....	.....	.....	2.00
California.				
Beaumont *	102	69	83.1	0.00
Boca *	109	33	61.9	0.00
Boulder Creek *	100	42	67.8	0.00
Dunsmuir *	101	48	69.5	0.00
Edgewood *	92	40	66.0	0.00
Evergreen	.....	.....	.....	0.00
Galt *	104	60	77.0	0.00
Hornbrook *	102	45	74.4	0.00
Ontario *	102	70	83.3	0.00
Pleasanton *	100	59	74.8	0.00
Upper Mattole *	93	40	.....	.....
Woodland *	95	42	71.8	0.00
Colorado.				
Platoro	.....	.....	.....	3.25
Connecticut.				
Lake Konomoc	.....	.....	.....	5.20
New Hartford (2)	.....	.....	.....	2.36
Kansas.				
Concordia	92	56	70.5	3.30
Leoti	100	48	80.2	4.14
Peabody	.....	.....	.....	2.25
Shields	.....	.....	.....	2.25
Kentucky.				
Falmouth (1)	.....	.....	.....	0.78
Maine.				
Gardiner	84	48	64.0	1.60
Kent's Hill	82	47	65.7	2.12

Stations.				
Massachussetts.				
Fall River (2)	81	52	68.5	6.65
Salem (2)	.....	.....	.....	4.29
Worcester (2)	82	48	66.7	.....
Mississippi.				
Kosciusko *	92	61	75.6	1.14
Nebraska.				
Ansley	97	40	73.4	1.23
Bingham	93	46	71.7	2.95
Fort Omaha	90 0	54 0	74.30	2.74
New Hampshire.				
Mine Falls	.....	.....	.....	2.31
Pennichuck Station	.....	.....	.....	2.20
New Mexico.				
Antelope Springs	.....	.....	.....	0.16
Belen	.....	.....	.....	1.51
Cañon de Chama	.....	.....	.....	2.16
Cuba	.....	.....	.....	1.27
Embudo	.....	.....	.....	1.33
Good Hope	.....	.....	.....	0.84
Jaquez	.....	.....	.....	0.61
Laguna	.....	.....	.....	2.50
Lamy	.....	.....	.....	1.80
Magdalena	.....	.....	.....	1.07
Monero	.....	.....	.....	0.92
Ojo Caliente	.....	.....	.....	1.95
Polvadeda Tract	.....	.....	.....	1.83
Rio Hondo	.....	.....	.....	0.90
San Marcial	.....	.....	.....	0.68
San Marcial (near)	.....	.....	.....	0.99
San Pedro	.....	.....	.....	0.60
Spader's Ranch	.....	.....	.....	3.65
Tonas	.....	.....	.....	1.64
Tres Piedras	.....	.....	.....	1.78
Wallace	.....	.....	.....	0.25
New York.				
Up. St. Regis Lake	83	43	63.7	2.45
North Carolina.				
Mount Pleasant	89	56	72.2	4.51
Ohio.				
Collinwood	.....	.....	.....	1.68
Virginia.				
Nottaway C. H	94	51	71.9	2.52
West Virginia.				
Wheeling	.....	.....	.....	1.88
Wyoming.				
Fort McKinney	93	40	70.4	0.15
Mexico.				
La Logia *	100	76	83.5	3.95
Mazatlan	91	79	84.7	7.97
Mexico	76	52	63.1	5.18
Topolobampo *	90	78	83.8	5.86
West Indies.				
Grand Turk Isl'd.‡	85	82	83.8	0.92
Hayti.				
Port au Prince	98	68	82.6	4.25

*Extremes of temperature from observed readings. †Signal Service instruments. ‡One observation daily at 10.00 a. m. Letters of alphabet denote number of days missing. Correction: The minimum temperature at Soda Springs, Idaho, for August, should be 32° instead of 42°.

Table of miscellaneous meteorological data for September, 1889—Signal Service observations.

Stations and districts.	Elevation above sea-level, feet.	Pressure, in inches. Mean actual.	Mean reduced.	Monthly range.	Temperature of air, in degrees Fahrenheit. Monthly mean.	Departure from normal.	Maximum.	Mean maximum.	Minimum.	Mean minimum.	Greatest daily range.	Least daily range.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.	Departure from normal precipitation.	Wind. Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Direction.	Date.	Cloudless days.	Partly cloudy days.	Cloudy days.	Days with rainfall.	Average cloudiness, tenths. 8 a. m.	8 p. m.	Temperature data since opening of station. Length of record, years.	Absolute maximum.	Year.	Absolute minimum.	Year.
New England.					62.0	0.0									4.20	+ 0.60																
Eastport	53	29.98	30.04	1.05	58.0	+ 2.0	83	64.1	37	51.8	29	3	51.5	83.2	2.52	— 0.89	5,406	sw.	46	s.	19	12	9	9	9	3.3	1.5	17	83	*	35	1875
Portland	99	29.94	30.04	0.95	59.7	— 1.3	76	65.8	40	53.6	23	2	54.6	87.8	2.49	— 0.41	5,224	s.	31	sw.	18	7	9	14	6	5.7	5.5	18	94	1881	33	1888
Manchester	247	29.80	30.06	0.97	61.8	.....	85	70.1	38	53.4	32	5	53.6	81.9	3.32	.....	3,563	nw.	20	nw.	22	8	9	13	10	6.3	6.3	3	85	1889	27	1888
M't Washington	6279	23.88	30.05	1.10	42.2	+ 1.2	64	47.3	14	37.1	23	5	37.0	86.6	7.01	— 1.38	20,120	sw.	104	nw.	19	5	6	19	16	3.5	4.0	17	65	1880	11	1879
M't Killington	.....	26.11	.....	0.96	47.6	.....	72	53.3	30	41.8	26	3	43.6	91.2	3.87	.....	17,813	nw.	62	nw.	19	6	5	19	7	2.8	3.9	1	72	1889	20	1889
Northfield	871	29.12	30.04	0.99	57.4	.....	83	66.8	30	47.9	35	4	51.2	84.5	4.06	.....	4,565	s.	36	n.	27	5	8	17	16	6.4	6.1	3	83	1889	25	1888
Boston	125	29.93	30.07	0.93	62.8	— 0.2	83	69.0	43	56.7	23	5	56.0	83.2	1.30	+ 2.30	8,205	sw.	36	ne.	10	8	8	14	10	5.2	5.5	19	101	1881	34	1879
Nantucket	14	30.04	30.05	0.88	63.0	.....	76	67.7	50	58.2	14	3	59.1	87.3	3.12	.....	9,103	*	42	e.	10	11	9	10	9	5.6	3.7	3	76	1859	41	1888
Wood's Holl	22	30.04	30.06	0.90	63.4	.....	76	68.0	48	58.9	16	4	59.2	88.2	3.37	+ 0.94	10,890	ne.	50	nw.	19	8	7	15	13	5.9	4.7	12	84	*	39	1888
Vineyard Haven	.....	.....	.....	.....	64.9	.....	82	71.4	38	58.4	22	4	.....	.....	2.94	.....	.....	*	.....	.....	.....	14	7	9	10	.....	.....	.....	.....	.....	.....	.....
Block Island	26	30.03	30.06	0.89	63.0	— 1.0	74	67.0	49	58.9	14	2	60.0	89.6	3.41	+ 0.47	14,335	sw.	66	ne.	10	12	7	11	14	6.1	4.7	10	86	1881	42	1883
Narragansett Pier	22	.....	.....	.....	63.6	+ 1.6	79	70.2	39	56.9	23	3	.....	.....	3.79	+ 1.14	.....	*	.....	.....	.....	14	7	9	10	.....	.....	.....	3	82	1889	38	1889
New Haven	107	29.93	30.04	0.89	63.0	— 1.0	80	69.9	42	56.2	23	5	57.6	86.7	4.98	+ 1.49	6,577	Ese.	36	ne.	11	7	8	15	17	6.9	6.0	17	100	1881	32	1888
New London	47	29.98	30.03	0.87	63.8	— 0.2	79	69.0	44	58.6	21	3	57.0	81.8	4.93	+ 1.71	5,935	ne.	36	sw.	18	6	6	18	14	7.2	6.3	18	92	1881	35	1888
Mid. Atlantic States.					65.3	— 2.6									5.27	+ 1.59																
Albany	85	29.97	30.06	0.93	64.2	+ 0.2	86	72.6	42	55.7	28	5	55.6	81.5	3.68	+ 0.46	4,800	*	22	se.	6	7	10	13	11	6.8	6.1	16	96	1881	33	*
New York City	185	29.85	30.04	0.86	65.8	— 1.2	85	72.1	46	59.5	22	5	57.6	79.8	7.43	+ 4.15	8,826	n.	41	n.	10	10	9	11	15	5.2	5.9	18	100	1881	36	1872
Harrisburg	361	29.68	30.07	0.77	63.8	.....	82	70.3	44	57.3	25	4	56.2	80.8	4.53	.....	5,040	w.	30	w.	21	8	7	15	17	6.8	5.8	2	82	1889	36	1888
Philadelphia	117	29.93	30.05	0.80	66.4	— 2.6	87	73.5	47	59.4	22	4	57.4	80.0	4.06	+ 1.37	9,307	ne.	54	ne.	11	7	6	17	17	6.1	5.7	19	102	1881	40	1888
Atlantic City	53	29.97	30.02	0.76	64.4	— 3.6	82	69.7	45	59.0	24	3	60.0	85.8	3.17	+ 0.02	10,389	ne.	72	ne.	10	7	13	10	11	5.3	4.9	16	94	1880	37	1888
Baltimore	76	29.95	30.04	0.76	66.5	— 2.5	84	73.5	49	59.5	25	5	58.0	77.7	4.59	+ 0.91	5,141	ne.	30	n.	10	9	8	13	17	6.1	5.0	18	101	1881	39	1888
Washington City	112	29.94	30.06	0.76	65.6	— 3.4	86	73.4	42	57.9	30	5	58.0	81.6	3.88	+ 0.08	5,462	s.	28	n.	10	8	10	12	15	7.0	5.0	20	104	1881	38	1879
Lynchburgh	658	29.36	30.07	0.75	66.7	— 3.3	87	75.4	42	58.9	28	4	57.1	78.8	10.69	+ 7.47	2,921	n.	23	ne.	24	11	11	8	12	5.5	4.1	17	98	1881	35	1888
Norfolk	69	29.96	30.03	0.71	68.4	— 3.6	88	74.9	46	61.8	25	3	61.2	82.8	5.41	+ 0.75	6,513	nw.	48	nw.	10	8	10	12	17	5.5	4.8	19	96	1880	40	1888
S. Atlantic States.					73.6	— 1.5									3.84	— 1.87																
Charlotte	808	29.24	30.08	0.68	70.1	— 1.9	89	79.9	45	60.3	27	9	60.8	79.4	2.88	+ 0.13	3,285	nw.	25	ne.	24	10	11	9	6	4.2	3.0	11	94	1881	38	1888
Hatteras	11	30.03	30.05	0.64	71.0	— 3.0	83	75.4	57	66.7	15	4	64.0	80.0	5.09	— 1.55	10,362	ne.	45	n.	19	15	7	8	9	3.8	3.7	9	90	1881	50	1888
Raleigh	375	29.66	30.05	0.67	68.7	.....	87	77.5	42	59.9	28	6	59.6	80.0	1.68	.....	4,001	n.	25	nw.	11	8	13	9	7	4.0	4.2	3	92	1887	39	1888
Southport	.....	.....	.....	.....	71.6	— 2.4	86	79.5	48	63.6	23	5	.....	.....	1.80	— 3.78	.....	se.	.....	.....	.....	19	6	5	3	.....	.....	.....	3	96	1889	46	1888
Wilmington	52	29.99	30.05	0.62	71.8	— 2.2	87	80.1	48	63.4	26	11	65.5	82.7	3.18	— 3.66	4,152	n.	24	*	24	15	8	7	8	3.7	2.8	19	96	1872	42	1887
Charleston	52	30.00	30.05	0.54	75.8	— 0.2	91	82.7	58	68.8	23	7	66.6	78.0	2.17	— 3.86	5,620	sw.	45	se.	23	14	9	7	4	3.2	2.6	17	94	1876	49	1887
Columbia	.....	.....	.....	.....	73.2	.....	91	82.9	50	63.6	30	14	.....	.....	2.41	.....	.....	se.	.....	.....	.....	9	14	7	7	4.3	2.2	17	94	1876	49	1887
Augusta	183	29.88	30.08	0.60	74.6	— 1.4	94	84.9	48	64.2	31	9	65.0	81.6	2.43	— 1.10	2,010	se.	17	sw.	24	12	11	7	6	4.9	3.4	17	98	1887	42	1888
Savannah	87	29.96	30.05	0.52	75.0	— 1.0	91	83.0	55	67.0	27	8	66.6	80.6	4.68	— 0.55	3,910	w.	26	se.	23	9	14	7	8	4.0	2.5	19	96	*	48	1888
Jacksonville	43	29.99	30.04	0.45	78.1	+ 0.1	95	86.3	57	69.9	26	4	69.0	80.8	8.49	— 0.60	3,822	e.	32	s.	23	18	5	7	10	3.8	3.0	19	98	1875	55	1888
Florida Peninsula.					80.4	— 1.1									9.42	+ 3.88																
Cedar Keys	22	30.00	30.02	0.42	79.4	— 0.6	91	85.4	65	73.3	18	6	71.8	82.6	4.97	+ 0.49	6,474	ne.	42	se.	23	12	11	7	14	4.2	4.0	10	94	1881	55	1888
Jupiter	28	29.98	30.01	0.35	79.8	.....	90	85.2	71	74.5	14	7	74.4	82.2	6.15	.....	5,884	ne.	46	e.	16	13	8	9	14	4.9	4.9	2	90	1889	67	1888
Key West	22	26.96	29.98	0.32	81.4	— 1.6	89	86.4	71	76.4	15	6	75.4	80.6	13.87	+ 7.28	5,553	e.	60	e.	16	9	14	7	19	6.1	5.1	19	97	1886	70	1886
Micco	.....	.....	.....	.....	81.0	.....	97	88.5	66	73.4	23	4	.....	.....	0.95	.....	.....	e.	.....	.....	.....	13	6	11	8	.....	.....	2	97	1889	68	*
Titusville	44	29.99	30.03	0.40	79.4	.....	89	85.4	66	73.3	21	4	73.1	82.5	2.87	.....	8,438	e.	47	e.	16	9	13	8	13	3.6	4.5	3	92	1887	58	1888
Eastern Gulf States.					76.6	— 1.2									4.98	+ 0.62																
Atlanta	1,139	28.88	30.06	0.67	70.0	— 2.0	92	79.0	45	60.9	27	6	59.7	77.6	6.32	+ 3.25	5,734	nw.	30	e.	23	11	15	4	9	4.0	2.9	11	93	1887	43	1888
Pensacola	56	29.95	30.01	0.65	77.3	— 0.7	93	84.9	54	69.7	26	5	68.2	76.9	4.70	— 0.94	6,340	ne.	40	se.	23	15	13	2	8	2.1	2.2	10	94	1887	54	*
Auburn	.....	.....	.....	.....	73.7	.....	93	84.0	48	63.4	29	8	.....	.....	3.42	.....	.....	se.	.....	.....	.....	15	10	4	4	.....	.....	2	93	1889	46	1888
Mobile	35	29.99	30.03	0.68	76.7	— 1.3	93	85.6	53	67.8	30	10	67.6	79.8	6.97	+ 1.76	4,302	n.	30	n.	18	11	13	6	7	4.1	2.9	19	96	1887	52	1888
Montgomery	217	29.81	30.04	0.64	75.4	— 1.6	95	85.7	50	65.0	33	5	60.6	68.7	4.35	+ 1.56	2,824	n.	26	ne.	23	13	12	5	10	3.1	4.0	17	99	1887	46	1888
Meridian	358	29.67	30.05	0.57	72.6	.....	93	83.7	42	61.6	37	5	63.8	83.0	3.92	.....	2,564	n.	24	n.	18	15	8	7	7	3.8	3.8	1	93	1889	42	1889
Vicksburg	222	29.78	30.02	0.58	75.5	— 1.5	94	85.1	51	65.9	29	8	64.0	76.4	1.14	— 3.38	3,392	n.	21	n.	18	10	9	11	6	4.8	4.4	18	98	1881	48	1871
University	.....	.....	.....	.....	71.0	.....	92	79.8	48	62.2	29	3	.....	.....	3.17	.....	.....	n.	.....	.....	.....	9	13	9	8	.....	.....	3	99	1889	42	1889
New Orleans	52	29.94	30.00	0.61	78.6	— 0.4	94	86.5	58	70.8	21	9	67.6	76.5	6.40	+ 1.44	4,963	se.	30	sw.	25	14	14	2	11	1.7	3.1	19	94	*	56	1888
Port Eads	.....	29.98	.....	0.66	.....	.....	90	85.1	62	75.4	19	5	70.6	75.6	2.10	.....	.....	ne.	.....	.....	.....	8	11	11	9	5.0	6.1	1	90	1889	62	1889
Western Gulf States.					73.4	— 3.7									4.83	+ 0.38																
Shreveport	249	29.76	30.02	0.67	74.2	— 2.8	92	83.2	55	65.3	29	4	65.0	80.6	3.51	— 0.87	3,890	se.	31	s.	4	7	12	11	10	5.0	5.0	17	101	1881	47	1881
Fort Smith	470	29.55	30.05	0.74	70.2	— 4.8	92	80.4	42	60.1	34	8	60.6	80.8	5.35	+ 1.66	3,012	se.	17	se.	1	12	6	12	10	5.4	4.5	8	100	1884	40	1883
Little Rock	309	29.71	30.03	0.70	70.8	— 3.2	91	79.4	50	62.1	31	6	63.3	83.0	5.96	+ 2.82	3,061	n.	20	s.	4	7	15	8	13	4.7	4.9	11	97	1887	47	1881
Corpus Christi	20	29.95	29.97	0.48	75.9	— 3.1	88	81.5	56	70.3	18	3	70.4	82.4	12.69	.....	8,590	se.	42	se.	2	6	15	9	14	6.3	4.9	3	91	1888	56	1889
Galveston	44	29.96	30.00	0.50	77.5	— 2.5	88	82.7	57	72.3	21	9	69.4	78.7	3.98	— 3.63	8,598	se.	36	n.	25	11	10	9	12	4.3	4.7	19	93	*	57	*
Palestine	511	29.51	30.05	0.61	71.9	— 5.1	90	80.7	53	63.0	29	9	64.2	84.2	4.73	+ 1.03	3,105	ne.	18	nw.	24	10	2	14	11	4.0	6.1	8	96	1886	49	1883
San Antonio	781	29.19	30.00	0.56	73.6	— 4.4	92	82.1	52	65.1	27	4	63.6	79.2	5.47	+ 1.28	5,528	ne.	30	ne.	25	6	9	15	14	6.3	6.3	11	99	1877	50	1887
Rio Grande Valley.					77.8	— 3.2									4.84	— 1.36																
Brownsville	57	29.90	29.96	0.48	77.3	— 2.7	90	84.0	56	70.6	21	6	71.5	88.4	7.44	— 0.93	5,104	se.	44	se.	2	12	13	5	11	4.5	4.3	14	96	*	56	1889
Rio Grande City	230	29.76	30.00	0.57	78.4	— 3.6	98	89.3	54	67.5	38	10	68.8	84.8	2.25	— 1.82	5,758	se.	25	se.	12	3	14	13	9	5.7	6.3	13	106	1877	53	1883
Ohio Val. & Tenn.					67.1	— 3.1									4.68	+ 1.76																
Chattanooga	783	29.27	30.09	0.63	69.1	— 2.9	89	78.4	40	59.8	33	5	60.6	81.6	7.87	+ 4.13	3,256	nw.	26	ne.	23	15	6	9	14	4.4	3.6	11	96	1881	38	1888
Knoxville	980	29.07	30.10	0.65	67.5	— 3.5	89	77.1	40	57.9	31	7	59.0	82.4	5.74	+ 3.00	2,699	ne.	36	sw.	10	17	3	10	11	4.1	3.5	19	97	1881	35	1888
Memphis	349	29.69	30.06	0.68	71.4	— 2.6	92	80.2	51	62.5	28	3	61.0	78.2	3.01	— 0.18	3,961	n.	24	n.	25	11	12	7	9	4.6	4.3	17	99	1887	44	1875
Nashville	553	29.47	30.05	0.69	68.6	— 3.4	91	78.6	40	58.5	31	6	58.2	76.8	6.81	+ 3.11	2,987	nw.	24	ne.	16	14	7	9	11	4.2	3.6	19	99	1887	35	1888
Lexington	.....	28.97	.....	0.70	65.4	.....	88	74.0	40	56.9	30	6	56.0	76.3	6.79	.....	6,669	se.	50	nw.	5	14	7	9	12	5.6	4.0	2	88	1889	36	1888
Louisville	551	29.48	30.07	0.71	67.0	— 4.0	90	76.5	42	57.6	31	4	55.2	71.6	4.38	+ 1.48	3,608	sw.	29	e.	15	15	5	10	11	5.4	4.3	18	99	1881	36	1888
Indianapolis	766	29.24	30.05	0.71	64.5	— 2.5	90	74.2	39	54.8	30	6	51.6	69.6	3.79	+ 1.10	3,353	s.	24	nw.	15	13	8	9	9	4.8	3.7	16	94	1881	34	1888
Cincinnati	628	29.40	30.08	0.68	66.2	— 3.8	92	75.0	40	57.4	29	5	53.9	70.5	4.31	+ 2.07	4,203	n.	24	nw.	20	7	9	14	9	4.9	4.4	19	94	1881	35	1888
Columbus	837	29.18	30.07	0.72	63.8	— 3.2	91	73.3	38	54.2	30	6	52.6	72.2	3.34	+ 0.83	3,818	s.	40	w.	15	10	13	7	10	4.8	4.1	12	98	1881	35	1888
Pittsburgh	847	29.15	30.03	0.72	65.6	— 2.4	90	73.6	44	57.5	29	6	54.9	73.3	2.87	+ 0.30	3,646	*	24	nw.	28	9	9	12	11	5.4	5.1	17	101	1881	35	1879
Parkersburgh	638	29.40	30.08	0.74	64.0	.....	89	73.3	35	54.8	33	8	56.8	83.4	3.12	.....	3,332	s.	21	w.	17	15	10	5	10	3.7	3.2	2	89	1889	33	1888
Lower Lake Region.					62.7	— 1.5									2.61	— 0.59																
Buffalo	690	29.29	30.03	0.89	62.6	— 0.4	86	70.4	41	54.9	32	5	52.9	74.6	4.09	+ 0.81	6,927	s.	44	sw.	20	11	10	9	14	4.8	4.7	17	87	1884	35	1878
Oswego	335	29.66	30.02	0.97	61.4	— 1.6	84	68.1	42	54.6	27	4	54.0	77.8	2.52	— 0.10	7,660	se.	27	sw.	19	9	9	12	11	5.9	4.2	19	93	1881	36	*
Rochester	621	29.37	30.03	0.90	62.2	— 1.8	88	70.1	39	54.3	31	3	53.4	76.2	2.21	— 0.07	5,783	sw.	25	w.	19	9	9	12	12	5.0	3.8	17	98	1881	34	*
Erie	714	29.27	30.03	0.80	62.8	— 1.2	85	69.4	42	56.2	25	3	54.3	76.4	4.85	+ 0.74	8,285	s.	36	nw.	21	10	9	11	15	5.5	5.3	17	92	1887	37	1888
Cleveland	678	29.32	30.04	0.72	63.2	— 1.8	89	71.2	43	55.3	28	4	53.5	75.2	4.29	+ 0.51	6,170	se.	29	sw.	5	11	4	15	14	4.9	5.2	18	98	1881	36	1887
Sandusky	629	29.37	30.04	0.76	64.0	— 2.0	90	71.8	40	56.1	27	5	53.2	73.0	1.84	— 1.43	6,354	e.	27	nw.	20	9	11	10	9	4.7	4.3	13	96	1881	36	1880
Toledo	673	29.33	30.05	0.77	62.8	— 2.2	88	72.3	36	53.2	30	8	51.0	73.2	0.52	— 2.19	6,353	w.	32	se.	5	16	12	2	6	3.9	2.8	19	95	1881	34	1887
Detroit	662	29.32	30.04	0.82	62.7	— 1.3	85	72.0	36	53.4	28	7	51.4	73.5	0.56	— 2.24	6,438	sw.	40	sw.	5	10	9	11	5	3.5	3.2	19	97	1874	30	1883
Upper Lake Region.					59.0	— 0.4									3.07	— 0.65																
Alpena	609	29.33	29.99	0.92	57.2	+ 0.2	84	65.4	32	49.1	33	6	51.2	82.8	2.84	— 1.63	6,023	se.	30	nw.	5	7	8	15	14	4.6	5.0	17	92	1884	28	1887
Escanaba	608	.....	.....	.....	59.6	+ 2.6	82	68.7	30	50.4	32	4	.....	.....	2.68	— 1.34	.....	s.	.....	.....	.....	10	12	8	12	.....	.....	16	88	1888	26	1883
Grand Haven‡	620	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	17	85	1881	30	1879
Lansing	883	29.10	30.03	0.75	61.4	.....	90	73.4	29	49.4	35	8	50.8	75.6	0.85	.....	4,634	se.	28	se.	5	13	13	4	8	3.6	3.0	3	90	1889	29	1889
Manistee	615	29.32	29.98	0.68	60.1	.....	87	67.7	33	52.5	27	5	50.1	73.2	3.06	.....	6,601	s.	30	w.	17	13	8	9	11	4.4	3.4	....	87	1889	33	1889
Marquette	735	29.14	29.93	0.85	58.1	+ 1.1	84	66.1	34	50.1	30	7	49.0	77.9	3.71	— 0.83	7,386	nw.	36	sw.	19	6	13	11	12	7.1	5.3	16	97	1874	28	1883
Port Huron	639	29.36	30.04	0.86	61.0	— 1.0	87	70.4	32	51.6	29	6	51.6	75.8	0.46	— 2.15	7,788	s.	37	sw.	26	9	12	9	7	3.7	3.8	16	97	1881	31	1879
Sault de Ste. Marie	642	29.26	29.96	0.87	56.6	.....	80	64.1	34	49.1	30	3	50.3	85.0	5.60	.....	4,253	se.	23	se.	14	3	6	21	16	6.1	5.8	2	80	1889	32	1888
Chicago	715	29.26	30.02	0.74	62.8	— 2.2	84	69.9	35	55.7	25	3	50.8	69.2	2.75	.....	5,609	sw.	28	nw.	17	8	11	11	7	5.8	3.4	18	94	1881	35	1889
Milwaukee	697	29.26	30.00	0.70	59.8	— 2.2	83	67.3	34	52.2	28	6	50.6	77.8	3.45	+ 0.29	7,426	sw.	36	nw.	18	12	9	9	7	4.8	4.0	19	94	*	32	1876
Green Bay	616	29.32	29.98	0.75	60.0	.....	86	68.7	33	51.4	33	4	50.6	77.6	4.68	+ 1.24	5,111	s.	25	s.	6	8	7	15	14	6.1	4.6	4	90	1886	31	1887
Duluth	672	29.19	29.93	0.75	54.8	— 1.2	76	61.8	36	47.7	34	4	44.6	74.0	4.02	— 0.40	5,576	sw.	29	w.	4	7	9	14	12	5.5	6.2	17	90	1874	30	*
Extreme Northwest.					53.6	— 1.9									2.30	— 0.91																
Moorhead	926	28.92	29.93	0.82	54.3	— 1.7	94	64.5	29	44.1	46	5	44.2	74.0	6.27	+ 4.16	9,061	n.	50	s.	1	10	12	8	10	5.4	4.4	9	94	1889	17	1883
Saint Vincent	804	29.02	29.90	0.98	51.6	— 1.4	94	62.0	28	41.2	48	4	41.5	75.4	2.77	+ 0.85	7,785	n.	52	s.	1	11	5	14	10	5.9	4.9	10	94	1889	17	1883
Bismarck	1,681	28.15	29.95	0.87	55.8	— 1.2	93	68.8	26	42.9

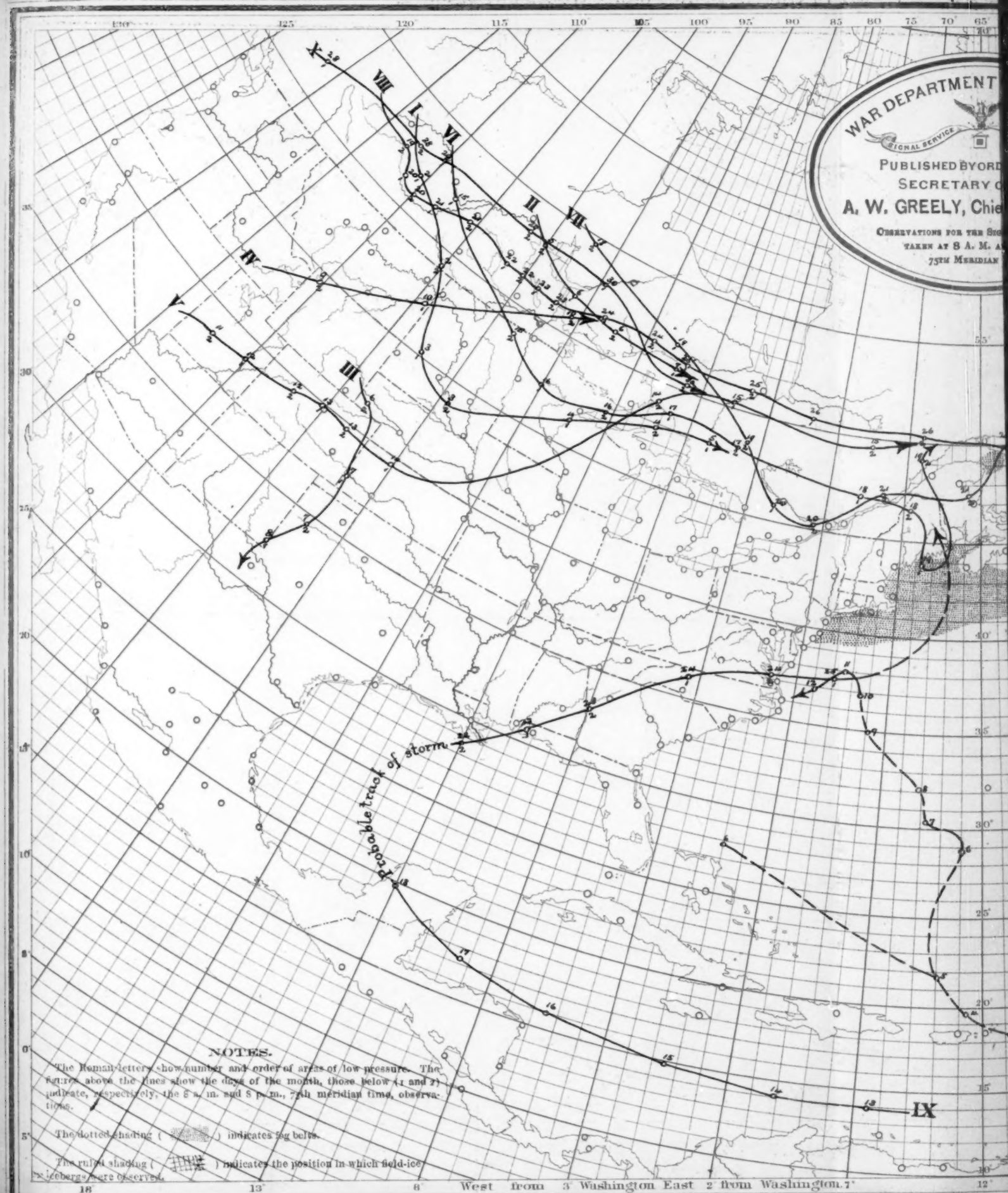
Table of miscellaneous meteorological data for September, 1889—Signal Service observations—Continued.

Stations and districts.	Elevation above sea-level, feet.	Pressure, in inches.			Temperature of air, in degrees Fahrenheit.							Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.	Departure from normal precipitation.	Wind.					Cloudless days.	Partly cloudy days.	Cloudy days.	Days with rainfall.	Average cloudiness, tenths.		Temperature data since opening of station.				
		Mean actual.	Mean reduced.	Monthly range.	Monthly mean.	Departure from normal.	Maximum.	Mean maximum.	Minimum.	Mean minimum.	Greatest daily range.	Least daily range.					Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.					8 a. m.	8 p. m.	Length of record, years.	Absolute maximum.	Year.	Absolute minimum.	Year.
Rx. northwest—Con.																															
Fort Buford	1,900	27.91	29.93	0.90	52.8	— 3.2	87	67.0	26	38.7	48	10	34.6	59.1	1.13	+ 0.40	6,851	nw.	48	nw.	4	5	12	13	10	5.3	6.0	11	100	1882	18	1883
Fort Yates	.....	.....	.....	...	50.0	.....	97	73.0	30	45.0	45	13	.....	.....	0.83	— 0.09	.....	nw.	....	.....	...	10	14	6	7	....	....	6	97	1889	24	1886
Upper Miss. Valley.					53.4	— 2.4									3.15	— 0.63															
Saint Paul	831	29.03	29.94	0.70	59.2	— 0.8	88	70.1	32	48.3	44	8	46.0	69.2	0.51	— 2.93	6,123	se.	36	w.	30	8	13	9	10	4.4	4.5	17	94	1878	30	1873
La Crosse	744	29.21	30.01	0.68	60.6	— 1.4	90	71.1	30	50.1	45	7	51.1	79.2	2.76	— 2.10	4,957	s.	26	nw.	30	8	12	10	11	4.0	5.6	17	92	1873	29	1888
Davenport	615	29.38	30.04	0.69	62.8	— 2.2	86	72.3	33	53.4	30	6	51.8	74.6	3.27	— 0.15	4,940	nw.	26	sw.	6	8	12	10	12	4.1	4.1	18	94	1881	33	1889
Des Moines	869	29.08	30.00	0.70	62.8	— 2.2	86	73.6	31	52.1	41	7	50.2	73.8	3.41	— 0.63	5,583	nw.	32	sw	6	15	6	9	11	5.1	4.3	12	93	1886	31	1889
Dubuque	651	29.31	30.02	0.69	62.6	— 0.4	90	72.5	31	52.8	36	3	54.8	82.9	1.54	— 3.39	3,490	nw.	26	w.	4	9	7	14	12	4.6	5.5	17	94	1881	31	*
Keokuk	618	29.38	30.04	0.64	64.0	— 4.0	87	73.2	33	54.8	39	5	53.7	76.2	5.14	+ 1.50	5,415	*	36	s.	4	9	14	7	16	4.9	4.3	19	97	1881	33	1889
Cairo	359	29.68	30.06	0.71	67.0	— 4.0	88	75.8	45	58.3	36	2	60.4	85.2	3.82	+ 1.17	3,937	*	33	w.	15	9	8	13	11	5.0	5.1	18	97	1881	42	1876
Springfield, Ill.	644	29.37	30.05	0.71	64.4	— 2.6	88	73.4	37	55.4	30	4	54.8	79.6	4.74	+ 0.95	4,483	s.	28	nw.	25	9	17	4	13	5.0	4.1	11	96	1887	36	1888
Saint Louis	371	29.46	30.07	0.67	67.0	— 4.0	90	75.5	42	58.4	30	8	55.0	71.6	3.54	— 0.00	6,719	sw.	36	w.	4	10	9	11	10	5.0	4.1	19	101	1881	40	1875
Missouri Valley.					61.3	— 2.9									2.74	+ 0.31															
Kansas City	947	29.04	30.04	0.69	64.6	.....	89	73.4	40	55.9	29	4	57.2	82.3	7.06	.....	5,404	se.	28	s.	22	11	8	11	14	4.2	5.0	2	92	1888	40	1889
Springfield, Mo	1,356	28.63	30.04	0.67	64.4	.....	86	73.1	38	55.6	29	3	55.6	82.0	2.01	.....	6,048	se.	34	nw.	24	11	7	12	14	5.4	4.4	3	92	1882	38	1889
Leavenworth	842	29.15	30.03	0.72	64.7	— 4.3	91	74.5	35	54.9	35	4	55.2	80.1	5.73	+ 2.10	3,761	s.	24	nw.	14	10	11	9	14	5.0	4.3	19	101	1882	35	1889
Topeka	.....	.....	.....	...	63.2	.....	91	75.7	33	50.7	38	7	.....	.....	4.28	.....	.....	s.	....	.....	...	6	19	5	11	....	....	3	97	1887	33	*
Omaha	1,113	28.85	30.03	0.78	63.6	— 2.4	88	74.4	36	52.9	40	10	51.1	72.6	1.74	— 1.78	5,393	s.	33	se.	22	11	8	11	7	4.9	4.5	17	99	1881	30	1873
Crete	.....	.....	.....	...	63.0	.....	91	75.6	34	50.4	42	10	.....	.....	1.97	.....	.....	nw.	....	.....	...	12	6	12	5	....	....	3	95	1888	34	1889
Valentine	2,613	27.28	29.98	0.81	58.4	.....	97	72.1	33	44.7	53	5	43.0	66.8	1.71	+ 0.12	8,488	nw.	48	n.	3	12	9	9	11	3.4	4.3	5	99	1888	29	1888
Sioux City	1,158	28.75	29.98	0.78	61.0	.....	85	72.7	36	49.3	46	8	47.8	70.8	1.71	.....	7,198	s.	42	s.	6	12	11	7	10	5.5	3.7	1	85	1889	36	1889
Fort Sully	1,600	28.26	29.95	0.81	60.2	— 2.8	98	72.6	36	47.7	46	5	40.6	59.2	1.09	+ 0.03	8,024	nw.	50	nw.	3	16	6	8	7	4.2	4.4	13	107	1874	18	1881
Huron	1,307	28.57	29.96	0.88	57.2	— 2.8	92	70.5	32	44.0	48	6	42.1	65.6	3.89	+ 2.28	9,137	nw.	42	s.	10	10	13	7	10	4.0	4.3	9	96	1884	26	1887
Yankton	1,234	28.67	29.98	0.86	60.7	— 2.3	88	73.0	34	48.4	45	4	47.0	69.9	2.31	— 0.87	5,842	nw.	27	nw.	13	13	8	9	7	4.1	3.7	17	99	1881	26	1876
Northern Slope.					55.4	— 2.0									0.92	— 0.30															
Fort Assinniboine	2,720	27.17	29.98	0.71	53.0	— 2.0	87	66.6	22	39.6	44	11	30.6	50.1	0.57	— 0.72	8,892	sw.	56	sw.	29	7	9	14	4	5.6	5.1	10	93	1888	22	1889
Fort Custer	3,040	26.84	29.97	0.73	55.4	— 3.6	86	69.6	30	41.2	49	12	39.2	62.2	0.51	— 0.26	5,416	se.	42	nw.	22	12	10	8	4	4.5	4.2	11	90	1885	29	1880
Fort Maginnis	4,340	.....	.....	....	53.8	— 0.2	82	65.0	24	42.7	45	3	.....	.....	1.43	— 0.09	.....	nw.	.....	.....	...	8	8	14	7	....	....	8	89	1888	24	1889
Helena	4,069	25.87	30.00	0.72	55.2	— 0.8	80	66.8	28	43.7	39	13	36.4	40.6	0.48	— 1.01	4,894	sw.	30	sw.	29	19	8	3	3	3.5	2.9	10	89	1888	28	1889
Rapid City	3,280	26.63	29.97	0.72	58.2	.....	94	70.9	30	45.4	40	5	36.2	51.8	0.37	— 0.61	7,185	nw.	48	nw.	3	12	9	9	4	4.0	5.0	4	97	1882	30	*
Cheyenne	6,105	24.08	30.01	0.58	55.0	— 2.0	87	69.5	28	40.6	42	8	22.4	38.2	0.54	— 0.37	7,780	nw.	42	s.	13	10	12	8	2	2.4	4.3	17	88	1875	23	1876
Fort McKinney	5,000	25.00	29.97	0.70	55.2	.....	84	66.9	31	43.6	44	11	30.4	43.0	0.17	.....	7,986	nw.	54	nw.	1	15	3	12	5	3.5	3.5	2	88	1888	31	1889
Fort Washakie	5,580	24.50	30.01	0.61	53.6	.....	89	69.8	27	37.3	48	8	30.5	48.1	0.14	.....	4,235	sw.	47	nw.	1	20	7	3	1	2.5	2.6	3	89	1882	26	1882
North Platte	2,841	27.10	30.02	0.82	59.8	— 3.2	90	74.3	31	45.2	46	4	42.8	63.8	2.57	+ 0.94	7,104	se.	37	se.	21	14	8	8	6	3.5	4.3	16	101	1881	21	1876
Middle Slope.					64.5	— 2.2									1.80	— 0.45															
Colorado Springs	.....	.....	.....	....	58.2	.....	90	72.6	28	43.8	46	12	36.3	51.0	0.86	— 1.27	.....	.....	.....	.....	...	17	11	2	4	2.9	3.4	3	90	1889	28	1889
Denver	5,281	24.81	29.99	0.65	60.0	— 2.0	94	74.9	30	45.0	44	9	31.8	44.4	0.28	— 0.65	4,571	s.	36	nw.	4	9	18	3	6	2.9	3.6	17	94	1889	28	1873
Pueblo	4,753	25.28	29.98	0.72	62.6	.....	97	77.7	31	47.5	50	16	31.0	45.1	0.69	.....	4,409	e.	36	ne.	4	15	11	4	4	2.9	3.6	2	97	1889	31	1889
Concordia	1,384	28.55	30.00	0.76	64.0	— 4.0	92	76.3	34	51.8	43	9	51.9	74.2	1.90	— 1.78	4,356	s.	26	s.	22	14	15	1	8	4.1	1.5	5	94	1887	34	1889
Dodge City	2,523	27.40	30.01	0.79	66.3	— 1.7	95	79.7	32	52.9	38	13	48.8	63.2	0.86	— 0.42	8,281	s.	46	s.	21	12	16	2	3	4.1	3.4	16	99	1881	30	1876
Wichita	1,354	28.57	29.99	0.76	66.4	.....	89	77.8	40	54.8	36	8	54.3	75.3	2.10	.....	5,882	s.	38	n.	23	7	16	7	9	5.2	3.4	2	92	1888	40	1889
Fort Reno	.....	.....	.....	....	69.0	.....	92	81.2	41	56.8	35	11	.....	.....	4.78	+ 1.43	.....	se.	....	.....	...	4	12	14	8	....	....	7	100	1886	40	1883
Fort Supply	.....	.....	.....	....	60.0	.....	93	81.5	30	50.6	44	18	.....	.....	1.97	— 0.37	.....	se.	....	.....	...	20	7	3	2	....	....	7	102	*	30	1889
Fort Elliott	2,650	27.28	29.96	0.74	67.8	— 1.2	92	80.1	41	55.5	38	7	55.0	74.2	1.94	— 0.06	8,926	s.	48	n.	4	13	10	7	6	5.3	5.5	9	98	1881	37	1888
Southern Slope.					69.2	— 2.2									3.49	+ 0.28															
Fort Sill	1,200	28.77	30.01	0.80	68.6	— 5.4	94	79.8	38	57.4	42	11	59.0	82.7	4.69	+ 1.65	7,285	s.	38	n.	24	10	15	5	10	5.7	3.9	13	100	1881	38	1889
Abilene	1,748	28.21	30.01	0.76	69.8	— 0.2	96	78.8	43	60.7	32	4	58.0	72.0	3.03	— 0.37	7,633	s.	40	nw.	4	8	13	9	8	6.0	4.2	4	96	1889	43	1889
Fort Stanton	6,150	24.03	29.90	0.50	59.4	.....	86	71.6	33	47.3	41	3	42.8	58.8	2.70	— 0.51	3,975	se.	25	w.	11	16	6	8	9	4.0	4.8	6	86	1889	31	1886
Southern Plateau.					70.8	+ 0.2									1.21	— 0.09															
El Paso	3,796	26.21	29.92	0.53	71.4	— 1.6	100	82.7	42	60.2	39	5	48.2	51.6	2.64	+ 1.46	6,122	e.	48	ne.	4	15	8	7	11	3.5	3.9	12	104	1879	42	*
Lava	.....	.....	.....	....	69.4	.....	100	83.6	40	55.3	40	18	.....	.....	1.30	— 1.32	.....	s.	....	.....	...	8	9	13	6	....	....	5	102	1885	40	1889
Santa Fé	7,026	23.35	30.01	0.49	61.0	+ 1.0	83	73.6	29	48.5	35	12	29.6	42.4	0.67	— 0.90	5,057	e.	46	n.	13	15	8	7	3	3.3	4.4	15	90	1879	27	1880
Fort Apache	5,020	.....	.....	....	66.0	+ 1.0	90	81.5	32	50.5	44	16	.....	.....	1.02	— 0.81	.....	sw.	....	.....	...	18	7	5	5	....	....	11	96	1883	32	*
Fort Bowie	.....	.....	.....	....	70.2	— 0.8	90	76.9	36	58.2	25	10	.....	.....	3.37	+ 2.11	.....	se.	....	.....	...	14	3	13	11	....	....	6	96	1885	36	1889
Fort Grant	4,860	25.23	29.97	0.32	70.2	— 0.8	93	82.3	40	58.2	30	11	47.0	50.6	0.69	— 1.02	5,888	w.	36	ne.	27	19	7	4	6	2.7	3.3	12	98	1879	40	1889
Fort McDowell	.....	.....	.....	....	81.4	.....	109	97.0	52	65.6	46	18	.....	.....	0.61	— 1.63	.....	sw.	....	.....	...	21	2	7	5	....	....	6	112	1885	50	1884
Fort Thomas	2,710	.....	.....	....	75.4	+ 1.4	102	89.0	44	61.7	42	10	.....	.....	0.38	— 0.60	.....	w.	....	.....	...	13	14	3	3	....	....	10	102	1889	43	1884
Fort Verde	.....	.....	.....	....	73.6	.....	98	88.5	43	58.7	43	17	.....	.....	1.60	+ 0.23	.....	w.	....	.....	...	18	10	2	4	....	....	13	104	*	31	1881
Phœnix	.....	.....	.....	....	80.4	.....	101	90.4	59	70.5	29	14	.....	.....	0.39	— 0.33	.....	sw.	....	.....	...	21	4	5	3	....	....	11	114	1883	39	1884
Whipple Barracks	5,389	24.77	29.98	0.36	63.6	— 0.4	87	78.0	37	49.2	42	11	39.9	51.6	2.11	+ 0.72	6,084	sw.	36	sw.	6	21	6	3	4	1.9	2.3	14	100	1879	29	1880
San Carlos	.....	.....	.....	....	71.9	.....	104	89.7	42	54.1	48	24	.....	.....	2.05	+ 1.36	.....	s.	....	.....	...	19	7	4	7	....	....	9	108	1886	42	*
Wilcox	.....	.....	.....	....	.....	.....	...	.....	...	.....	.....	...	.....	.....	.....	.....	.....	.....	....	.....	...	...	...	...	...	....	....	6	100	1885	32	1884
Yuma	141	29.68	29.82	0.54	83.8	— 0.2	106	98.0	58	69.7	40	15	55.2	45.8	0.00	— 0.15	4,789	s.	30	n.	24	29	0	1	0	0.6	0.6	14	113	1879	50	1882
Keeler	3,622	26.31	29.87	0.52	74.9	+ 0.9	97	86.8	50	63.0	33	15	40.4	32.8	0.08	— 0.28	4,244	s.	30	ne.	25	24	4	2	1	1.7	1.4	5	97	*	50	*
Middle Plateau.					69.6	— 2.4									0.44	— 0.32															
Carson City	.....	.....	.....	....	59.6	.....	88	77.6	28	41.6	47	15	23.6	31.4	0.00	.....	.....	.....	.....	.....	...	23	6	1	0	1.3	1.6	2	89	1888	28	1889
Winnemucca	4,340	25.72	30.05	0.62	58.5	— 1.5	87	76.0	29	41.0	53	16	6.6	15.2	0.00	— 0.31	6,960	w.	40	sw.	28	24	4	2	0	1.1	1.2	11	94	*	22	*
Fort Du Chesne	4,900	25.08	29.97	0.60	59.3	.....	90	78.4	28	40.2	54	11	27.8	42.4	0.36	.....	3,670	*	39	w.	22	17	10	3	2	1.8	2.3	2	91	1888	28	1889
Salt Lake City	4,348	25.70	30.02	0.55	60.6	— 3.4	84	73.0	35	48.1	36	9	29.7	33.8	0.52	— 0.41	3,567	nw.	24	nw.	22	22	5	3	3	1.6	2.1	16	92	1875	35	1889
Montrose	5,795	24.34	29.95	0.51	60.5	.....	87	74.8	27	46.2	50	12	28.8	37.0	0.80	— 0.25	4,121	s.	25	s.	13	19	7	4	5	3.5	3.0	5	88	1888	27	1889
Northern Plateau.					57.8	— 0.7									0.10	— 0.61															
Boisé City	2,750	27.22	30.05	0.75	58.8	— 1.2	88	74.7	28	43.0	42	18	26.2	33.9	0.06	— 0.42	2,674	w.	24	nw.	3	24	4	2	2	1.4	1.4	13	100	1888	28	1889
Ashland	.....	.....	.....	....	63.0	.....	95	80.1	34	45.9	47	15	.....	.....	0.00	— 1.03	.....	.....	.....	.....	...	20	4	6	0	....	....	6	102	1888	34	*
Baker City	3,526	26.55	30.15	0.66	54.8	.....	83	70.9	27	38.6	44	11	28.9	41.6	0.19	.....	5,099	se.	21	nw.	10	24	2	4	4	1.5	2.0	1	83	1889	27	1889
Fort Klamath	.....	.....	.....	....	48.5	.....	85	70.3	16	26.7	66	26	.....	.....	0.25	— 0.46	.....	w.	....	.....	...	22	2	6	1	....	....	6	88	1888	16	1889
Linkville	.....	.....	.....	....	58.3	.....	87	74.4	30	42.2	49	15	.....	.....	0.00	— 0.21	.....	n.	....	.....	...	25	2	3	0	....	....	6	91	1888	28	1887
Spokane Falls	1,941	28.02	30.05	0.70	56.8	— 0.2	86	71.7	26	42.1	42	10	35.0	51.4	0.37	— 0.92	3,988	sw.	29	sw.	9	13	11	6	4	3.5	4.2	9	98	1888	26	1889
Walla Walla	1,018	28.98	30.07	0.73	63.5	.....	88	75.8	38	51.2	37	8	33.6	37.4	0.33	.....	4,176	sw.	32	sw.	2	20	8	2	3	2.5	1.6	4	100	1888	38	*
N. Pac. Coast Region					57.8	— 0.3									3.74	— 0.28															
Fort Canby	179	29.87	30.07	0.72	57.8	— 0.2	86	63.2	46	52.5	29	4	51.3	82.1	4.78	+ 0.85	7,776	n.	76	s.	28	10	10	10	11	4.7	4.0	7	86	*	42	1884
Neah Bay	.....	.....	.....	....	55.4	.....	68	63.6	39	47.3	25	8	.....	.....	5.69	— 1.59	.....	e.	....	.....	...	13	3	11	7	....	....	6	72	1888	36	1887
Olympia	36	30.04	30.08	0.77	56.2	— 0.8	85	68.2	34	44.2	41	7	49.8	81.0	3.52	+ 0.42	2,345	s.	16	s.	30	17	6	7	7	4.2	2.8	13	85	1889	31	1877
Port Angeles	14	30.04	30.05	0.78	51.2	— 0.8	72	60.2	32	42.3	27	6	46.8	86.6	2.35	+ 0.28	2,665	s.	24	w.	7	9	11	11	10	6.4	3.5	4	75	1888	32	*
Pysht	.....	.....	.....	....	52.1	.....	74	62.6	36	41.6	28	10	.....	.....	4.62	— 1.38	.....	w.	....	.....	...	11	5	11	9	....	....	5	75	1886	34	1886
Tatoosh Island	.....	.....	.....	....	54.2	+ 0.2	70	58.8	44	49.7	18	0	.....	.....	5.26	— 0.92	.....	e.	....	.....	...	...	...	...	...	....	....	6	70	1888	43	1887
Astoria	38	.....	.....	....	59.4	— 0.6	87	66.8	41	52.0	31	8	.....	.....	5.59	+ 0.09	.....	sw.	....	.....	...	16	9	5	9	....	....	5	87	1889	41	1889
Portland	80	29.98	30.07	0.65	61.4	+ 0.4	89	73.4	38	49.3	36	7	51.2	74.0	1.61	— 0.29	4,126	nw.	25	s.	30	17	6	7	8	4.4	3.6	17	93	1886	38	1889
Roseburgh	523	29.53	30.09	0.54	61.0	— 0.2	90	76.5	35	45.4	47	10	45.2	63.2	0.24	— 0.58	2,762	e.	23	s.	29	22	3	5	4	1.1	2.3	12	99	1888	35	*
Mid. Pac. Coast Reg.					70.8	+ 2.8									T.	— 0.33															
Eureka	64	29.95	30.01	0.42	56.0	.....	77	63.1	40	48.8	26	6	49.4	82.5	0.32	.....	3,712	sw.	36	n.	10	15	7	8	4	1.7	1.7	3	77	1889	40	1889
Red Bluff	342	29.57	29.92	0.45	76.0	+ 3.0	105	90.4	52	61.5	38	18	37.2	29.2	0.00	— 0.58	5,367	nw.	36	nw.	23	28	2	0	0	0.0	1.0	7	13	106	1888	46	1884
Sacramento	64	29.84	29.90	0.46	71.9	+ 1.9	101	87.9	49	55.9	39	24	47.6	50.6	0.00	— 0.25	4,459	s.	36	nw.	23	31	0	0	0	0.0	0.1	13	106	1888	44	1882
San Francisco	60	29.89	29.95	0.42	64.6	+ 3.6	89	73.4	51	55.5	35	4	51.4	75.4	T.	— 0.16	5,840	sw.	27	sw.	2	16	6	8	0	4.2	2.9	19	94	1886	50	1887
Point Reyes Light	.....	.....	.....	....	.....	.....	...	.....	47	51.7	.....	.....	.....	.....	0.38	.....	.....	nw.	....	.....	...	14	0	16	10	....	....	.....	.....	.....	.....	.....
S. Pac. Coast Region.					71.4	+ 3.4									0.17	+ 0.14															
Fresno	328	29.55	29.89	0.44	75.6	.....	105	92.9	50	58.2	42	25	40.6	34.6	0.00	.....	3,911	nw.	16	nw.	22	26	4	0	0	0.4	0.6	3	111	1888	47	1887
Los Angeles	330	29.57	29.92	0.40	72.6	+ 3.6	103	84.8	52	60.3	41	13	53.9	64.8	0.34	+ 0.31	2,602	w.	15	w.	16	11	18	1	1	4.8	1.2	13	108	1885	44	1880
San Diego	93	29.82	29.92	0.39	70.2	+ 3.2	91	77.6	54	62.9	28	6	57.0	69.0	T.	— 0.04	3,691	nw.	24	ne.	25	22	6	0	0	0.5	0.1	18	101	1883	50	1882

NOTE.—The data at stations having no departures are not used in computing the district averages. Letters of the alphabet denote number of days missing from the record.
* Two or more directions, dates, or years. † Precipitation measured at the Boston Water Works; takes the place of the measurement at the Signal Office.
‡ Office and records destroyed by fire.

Form 106 G 1884.

Chart I. Tracks of Areas of Low P


WAR DEPARTMENT
SIGNAL SERVICE
PUBLISHED BY ORD
SECRETARY O
A. W. GREELY, Chie
OBSERVATIONS FOR THE SIG
TAKEN AT 8 A. M. A
75TH MERIDIAN
I
II
III
IV
V
VI
VII
VIII
IX
X
Probable track of storm
NOTES.
The Roman letters show number and order of areas of low pressure. The figures above the lines show the days of the month, those below (1 and 2) indicate, respectively, the 8 a. m. and 8 p. m., 75th meridian time, observations.
The dotted shading ( ) indicates fog belts.
The ruled shading ( ) indicates the position in which field-ice or icebergs were observed.
West from 3 Washington East 2 from Washington.

Pressure. September, 1889.

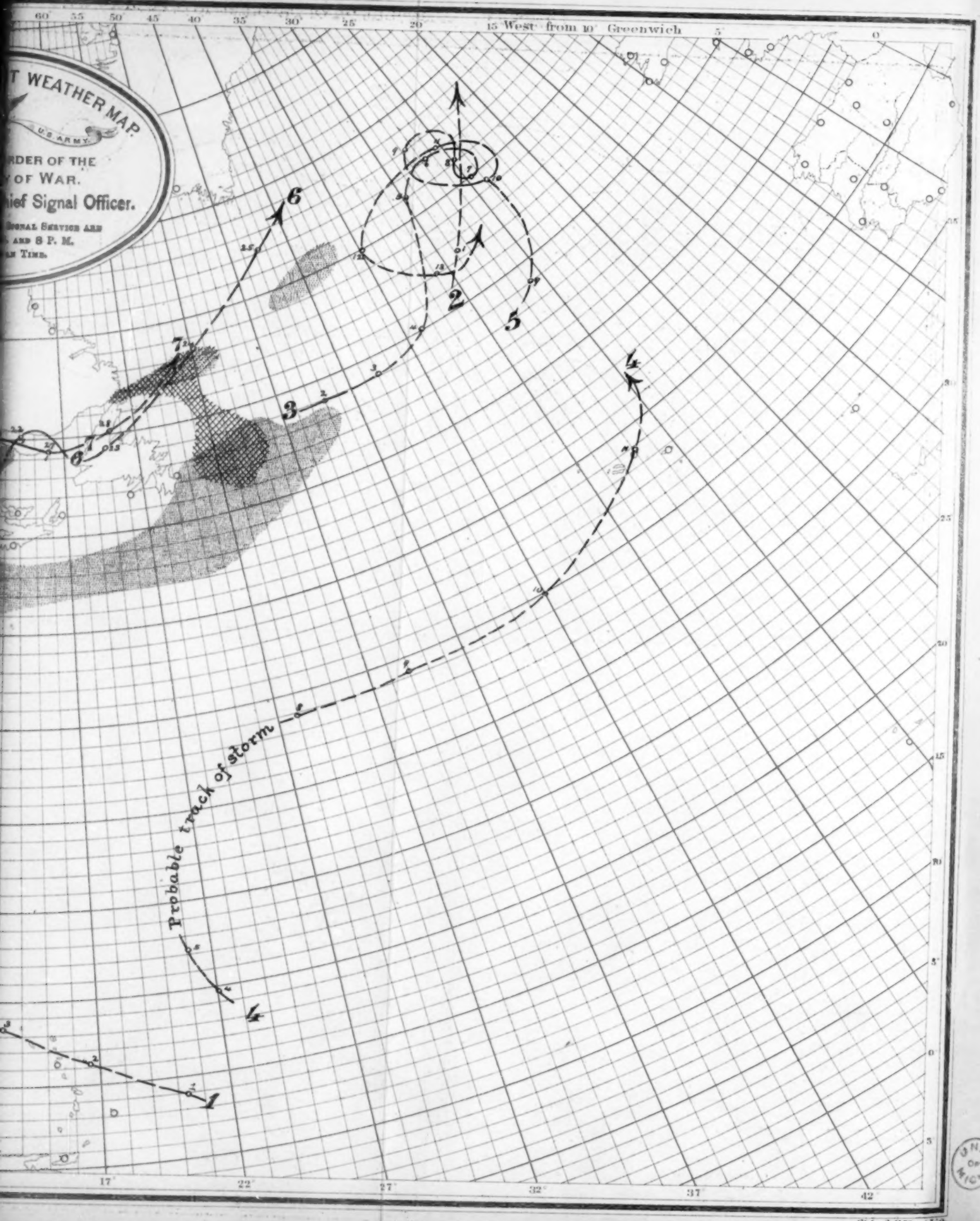


Chart II. Isobars, Isotherms, and Winds. September, 1889.

UNIV. OF MICH.

Form 106 F.

Chart II. Isobars, Isotherms, and Winds. September, 1889.

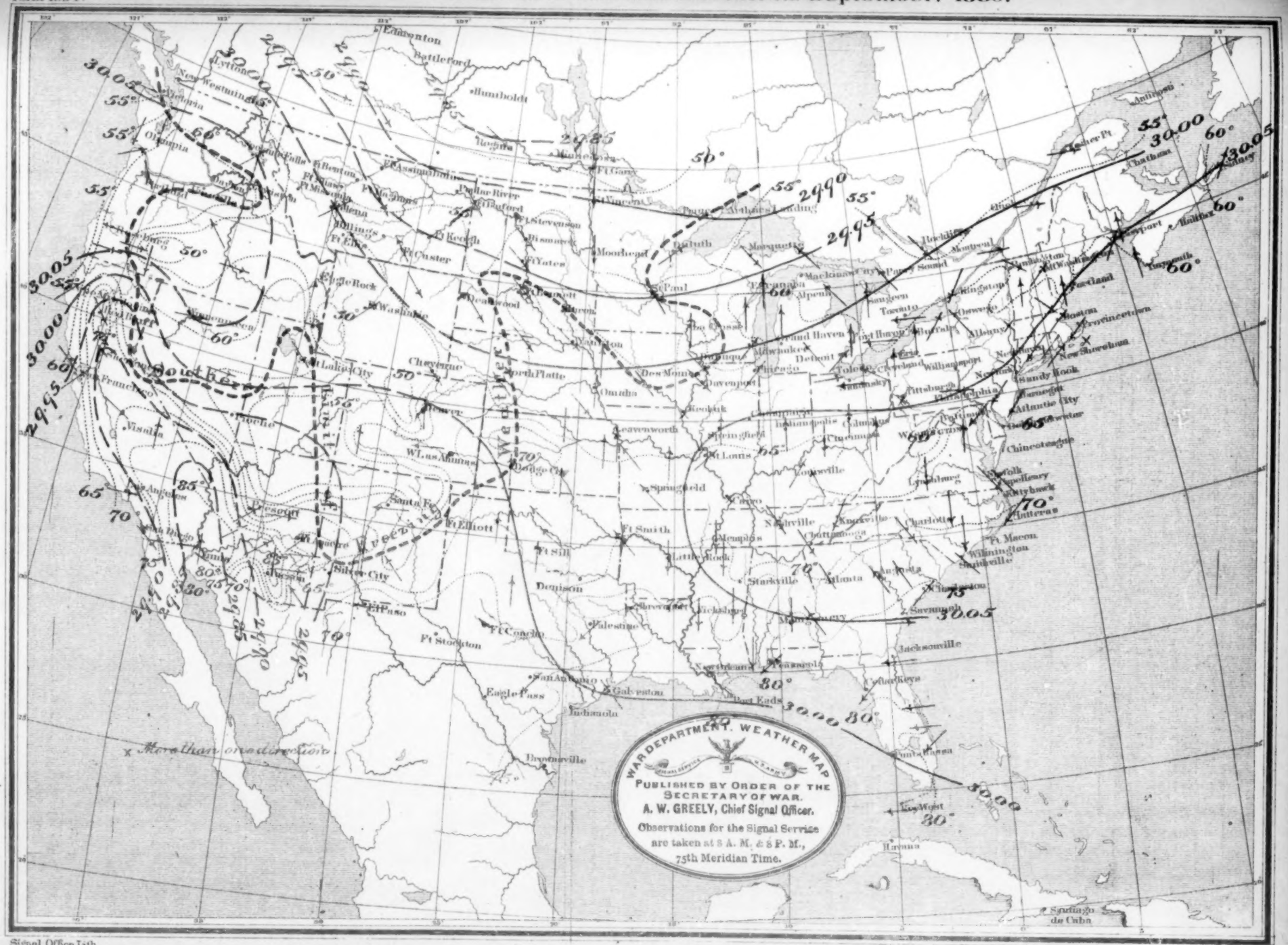
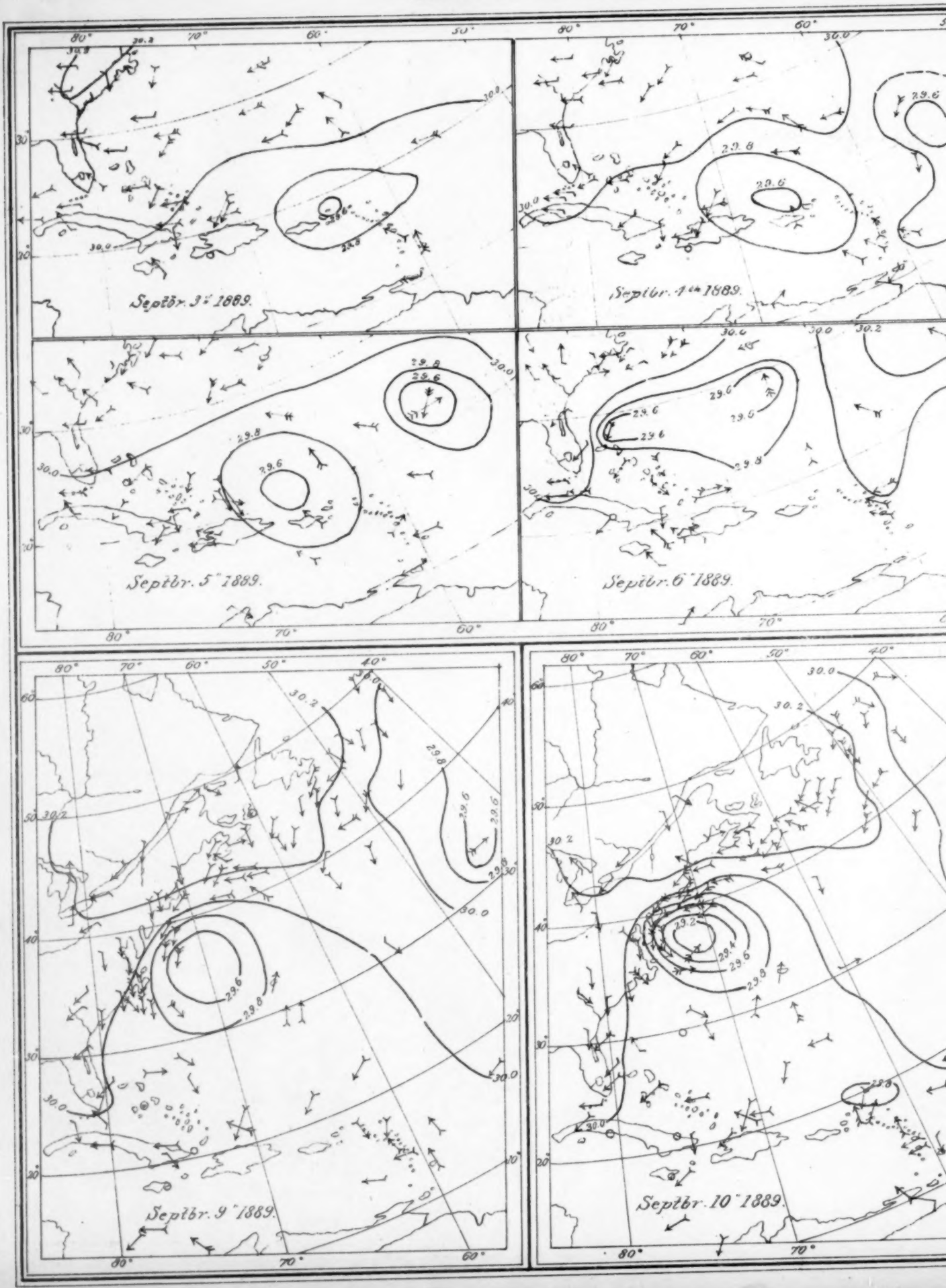
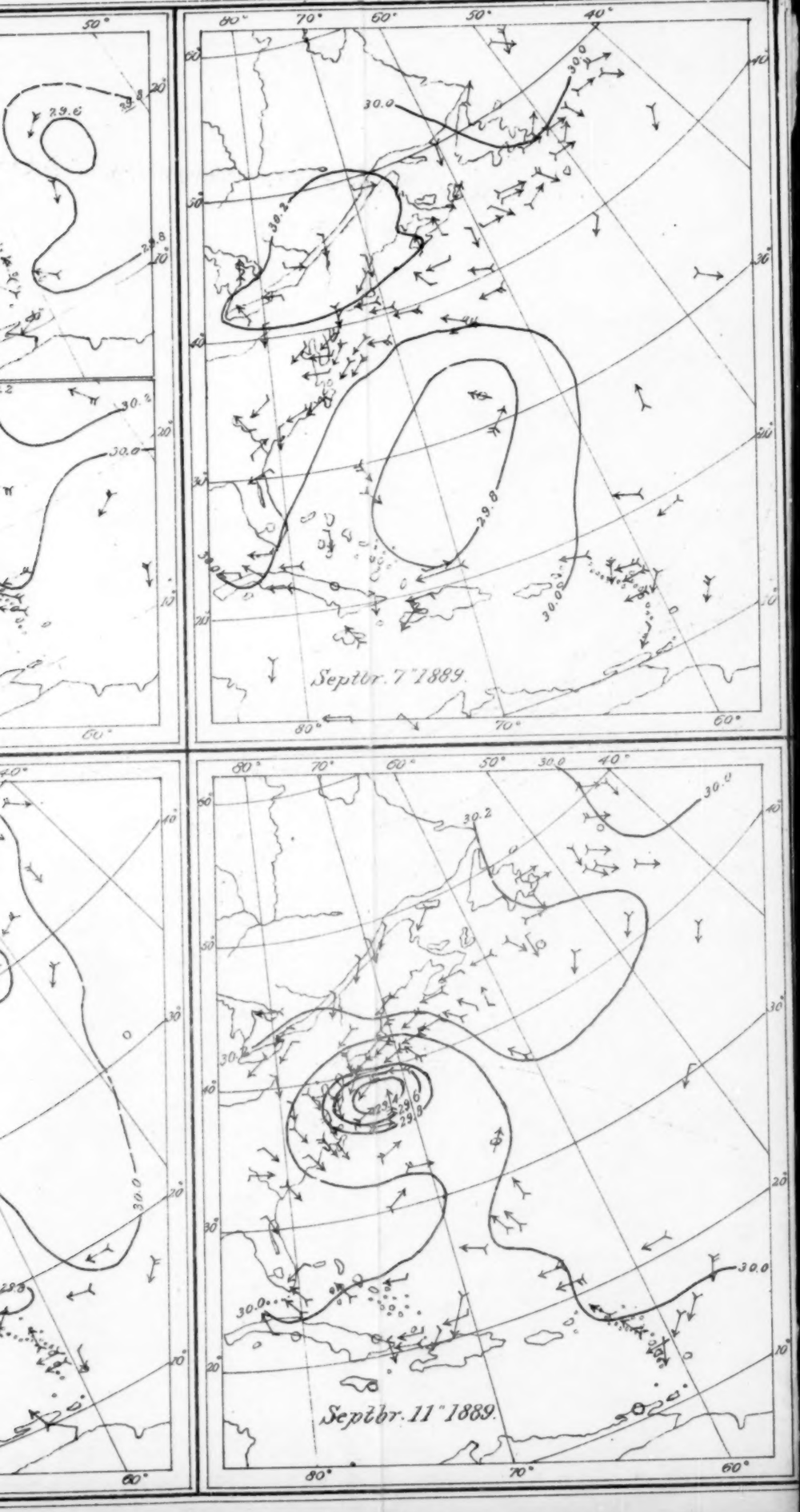

WAR DEPARTMENT. WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
A. W. GREELY, Chief Signal Officer.
Observations for the Signal Service are taken at 8 A. M. & 8 P. M., 75th Meridian Time.
More than one direction
Edmonton
Battleford
Humboldt
Winnipeg
Duluth
Moorhead
Bismarck
Huron
Chicago
Milwaukee
Detroit
Cleveland
Buffalo
Albany
Boston
Portland
Montreal
Toronto
Ottawa
Kingston
Rochester
Oswego
Erie
Pittsburgh
Philadelphia
Atlantic City
Sandy Hook
New York
Cincinnati
Louisville
Indianapolis
Columbus
Springfield
St Louis
Omaha
Davenport
Des Moines
North Platte
Cheyenne
Denver
Dodge City
Leavenworth
Kansas City
Topeka
Salt Lake City
Ogden
Virginia City
Helena
Miles City
Bismarck
Fort Custer
Fort Yates
Fort Buford
Fort Stevenson
Fort Keogh
Fort Assiniboine
Fort Maginnis
Fort Missoula
Fort Logan
Fort Ellis
Fort Washakie
Fort Bridger
Fort Douglas
Fort Duchesne
Fort Lapwai
Fort Walla Walla
Fort Spokane
Fort Canby
Fort Townsend
Fort Trumbull
Fort Niagara
Fort Ontario
Fort Columbus
Fort Hamilton
Fort Wadsworth
Fort Preble
Fort Constitution
Fort Sullivan
Fort Trumbull
Fort Adams
Fort Wetherill
Fort Hamilton
Fort Monroe
Fort Macon
Fort Caswell
Fort Moultrie
Fort Pulaski
Fort Marion
Fort Barrancas
Fort Pickens
Fort Morgan
Fort Gaines
Fort Jackson
Fort Pike
Fort Wood
Fort Brown
Fort Ringgold
Fort Duncan
Fort Clark
Fort McIntosh
Fort Bliss
Fort Stanton
Fort Wingate
Fort Lyon
Fort Sill
Fort Smith
Fort Elliott
Fort Concho
Fort Stockton
Fort Davis
Fort Grant
Fort Whipple
Fort Yuma
Fort Mohave
Fort Tejon
Fort Point
Fort Mason

Chart IV. Distribution of barometric pressure, wit



ure, with direction and force of wind attending storm traced as



ction and force of wind attending storm traced as number I.

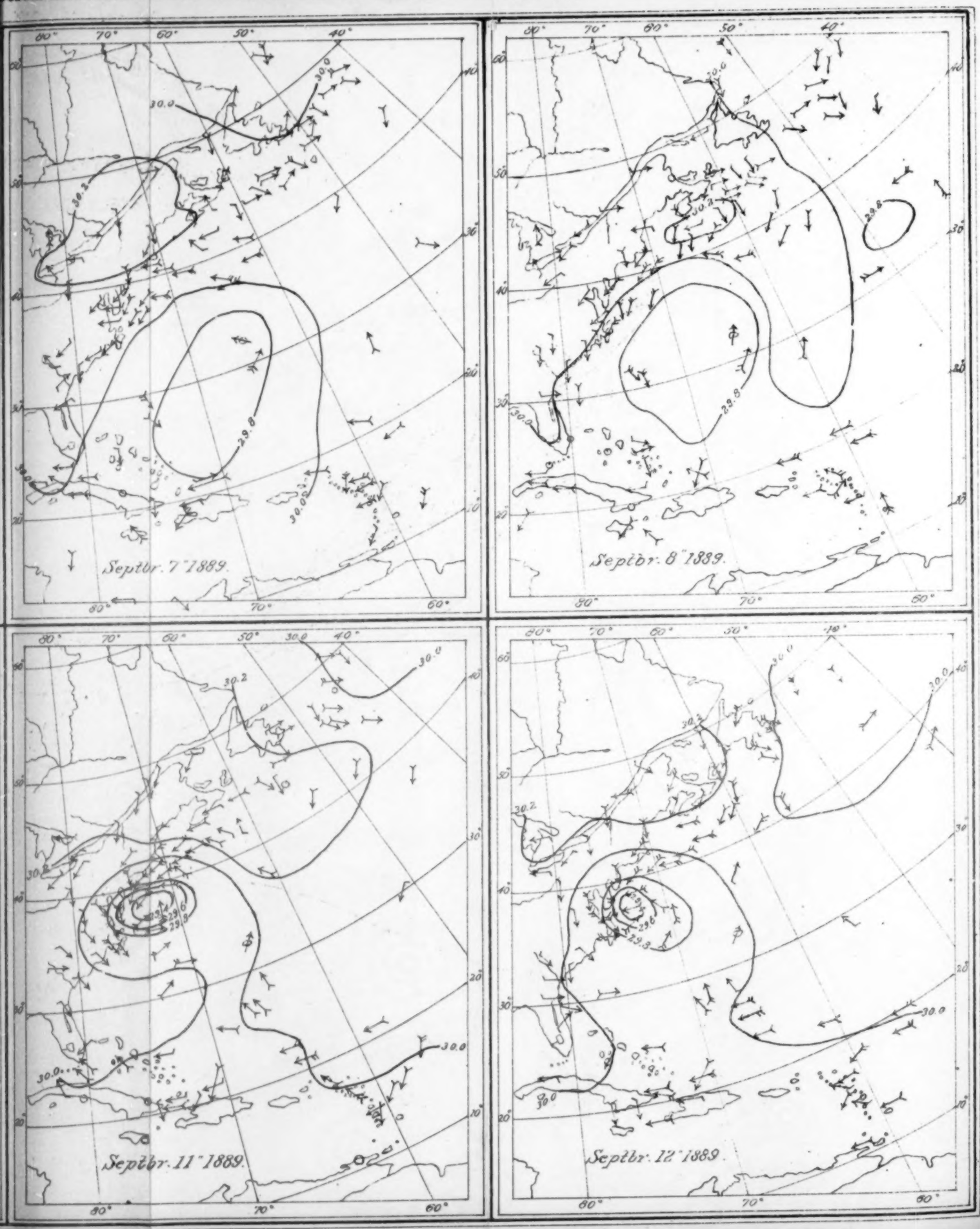
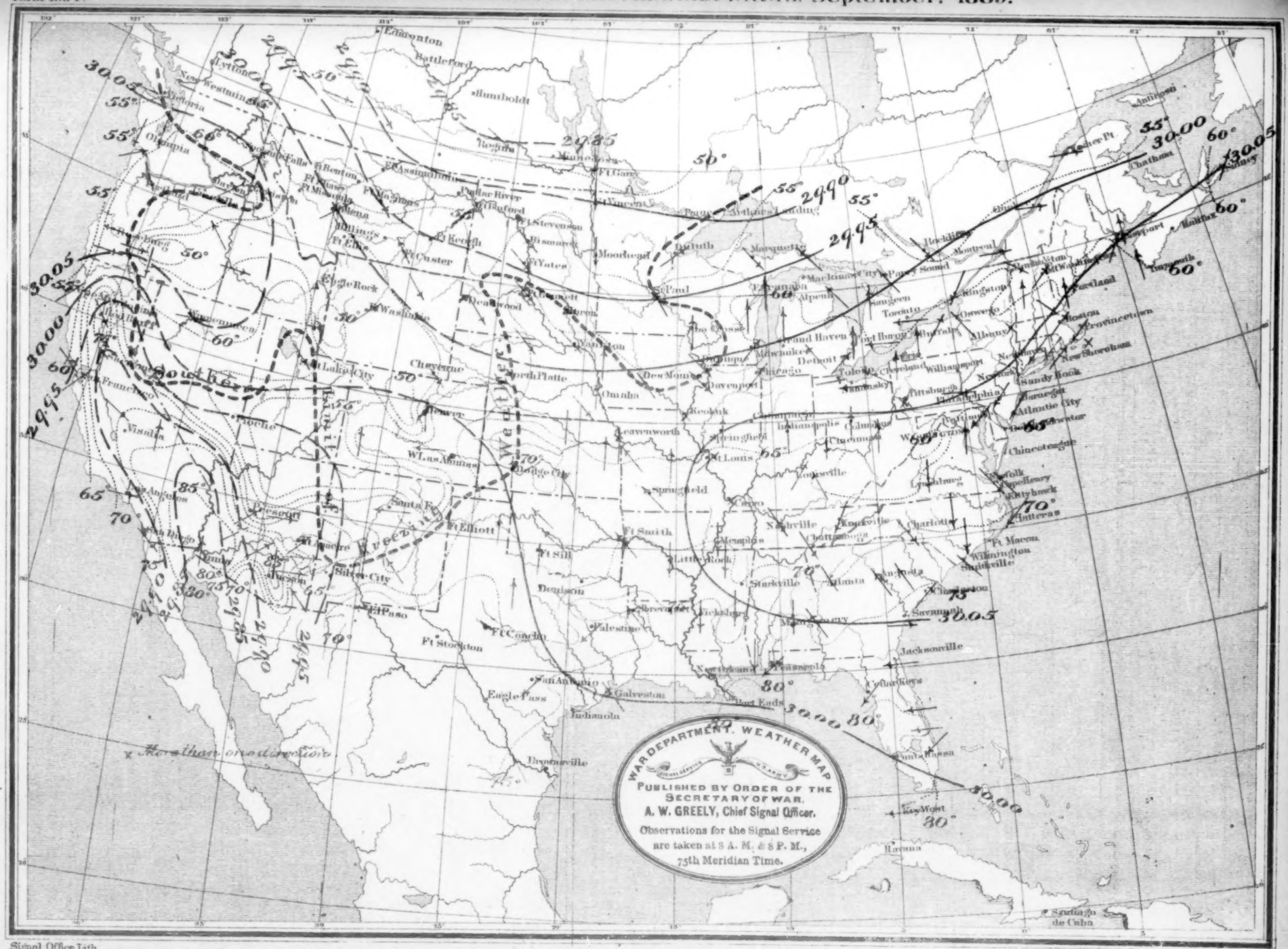


Chart II. Isobars, Isotherms, and Winds for September, 1889.

Form 106 E

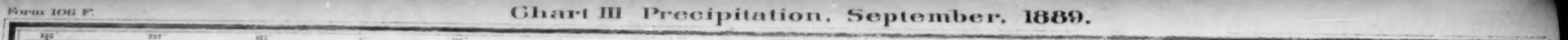
Form 106 F.

Chart II. Isobars, Isotherms, and Winds. September, 1889.


WAR DEPARTMENT. WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
A. W. GREELY, Chief Signal Officer.
Observations for the Signal Service are taken at 8 A. M. & 8 P. M., 75th Meridian Time.
Northeast
Northwest
Southeast
Southwest
Edmonton
Battleford
Humboldt
Qu'Appelle
Winnipeg
Duluth
Marquette
Toronto
Montreal
Quebec
Boston
Provincetown
New Shoreham
Sandy Hook
Atlantic City
Chincoteague
Hatteras
Ft Macon
Wilmington
Smithville
Charleston
Savannah
Jacksonville
Key West
Havana
Santiago de Cuba
Bismarck
Ft Custer
Ft Keogh
Ft Yates
Ft Stevenson
Ft Assiniboine
Ft Maginnis
Ft Benton
Ft Shaw
Ft Missoula
Ft Custer
Ft Ellis
Ft Coeur d'Alene
Spokane
Walla Walla
Dalles
Portland
Olympia
Tacoma
Seattle
Port Townsend
Eagle Rock
Deadwood
Yankton
Omaha
Des Moines
Davenport
Rockuk
Chicago
Milwaukee
Detroit
Cleveland
Toledo
Buffalo
Albany
Pittsburg
Philadelphia
Harrisburg
Baltimore
Washington
Lynchburg
Norfolk
Cincinnati
Indianapolis
Columbus
Springfield
Louisville
St Louis
Leavenworth
Topeka
Dodge City
Cheyenne
North Platte
Denver
Salt Lake City
Virginia City
Helena
Miles City
Bismarck
Moorhead
St Paul
Duluth
Marquette
Port Arthur
Parry Sound
Toronto
Kingston
Oswego
Montreal
Quebec
Father Pt
Antigua
Chatham
Halifax
Sydney
Yarmouth
Eastland
Boston
Provincetown
New Shoreham
Sandy Hook
Atlantic City
Chincoteague
Hatteras
Ft Macon
Wilmington
Smithville
Charleston
Savannah
Jacksonville
Key West
Havana
Santiago de Cuba
Ft Sill
Ft Smith
Little Rock
Memphis
Nashville
Knoxville
Chattanooga
Atlanta
Starkville
Montgomery
Vicksburg
Shreveport
Meridian
Dallas
Denison
Palestine
Galveston
Port Eads
Indianola
Brownsville
Eagle Pass
San Antonio
Ft Concho
Ft Stockton
El Paso
Silver City
Santa Fe
Ft Elliott
Wichita
W Las Animas
Los Angeles
San Diego
Yuma
Prescott
Visalia
San Francisco
Roseburg
Red Bluff
Eureka
Carson
Reno
Winnemucca
Ogden
Salt Lake City
Cheyenne
North Platte
Denver

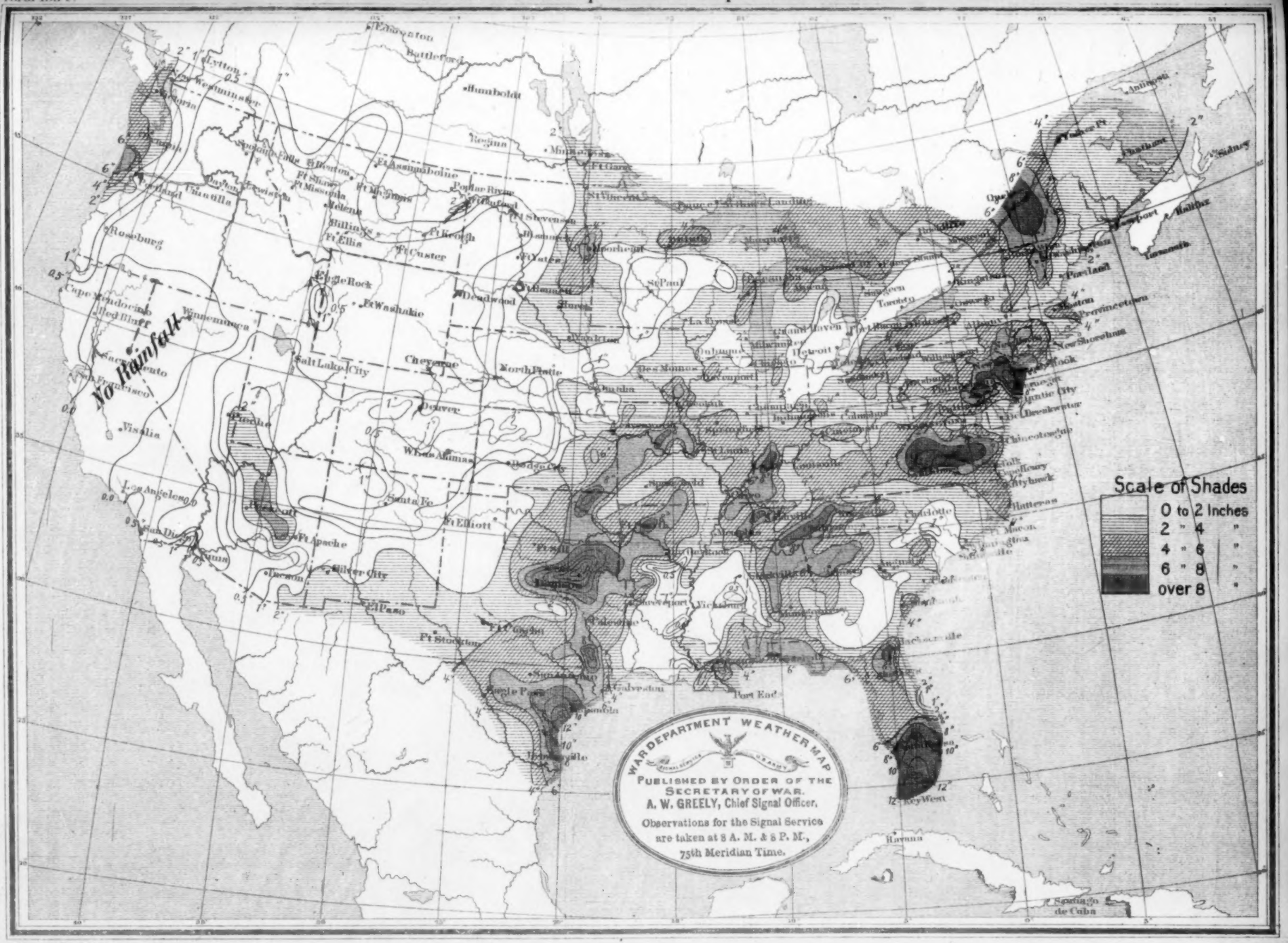
Form 106 F.

Chart III Precipitation, September, 1889.



Form 106 F.

Chart III Precipitation, September, 1889.


No Rainfall
Scale of Shades
0 to 2 Inches
2 " 4 "
4 " 6 "
6 " 8 "
over 8 "
WAR DEPARTMENT WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
A. W. GREELY, Chief Signal Officer.
Observations for the Signal Service are taken at 8 A. M. & 8 P. M., 75th Meridian Time.

Signal Office 15th.

List of voluntary stations of the Signal Service, with their respective observers, who furnish meteorological reports for the Monthly Weather Review. Reports have not been received from those marked with an asterisk (*) in time to be used in the Review for September, 1889.

Place of observation and observer.

ALABAMA.
Auburn, Ala. Weather Service.
Bermuda, Wm. Fowler.
Citronelle, J. G. Michael.
Columbiana, W. D. Lovett.
Livingston, Prof. J. W. A. Wright.
*Laverne, J. O. Sentell.
Motes, A. M. Weiler.
Mount Willing, W. M. Garrett.
Valley Head, E. P. Nicholson, M. D.
Wiggins, M. D. Jones.

ARIZONA.
Antelope Valley, Mrs. J. H. Hamilton.
Ash Canyon, Jno. S. Robbins.
Bangharts, Geo. Banghart.
Cedar Springs, B. E. Norton.
*Cooley's, G. M. Adams.
Eagle Pass, Dr. R. B. Tripp.
Fairbank, S. W. Wood.
Flagstaff, M. J. Riordan.
Florence, A. T. Colton, C. E.
Gila Bend, David Murphy.
Globe, J. H. Hamill.
Holbrook, David Rope.
Lochiel, C. Cameron.
Mount Huachuca, J. W. Stump.
New River, J. F. Singleton.
Teviston, Miss Mary Tevis.
Tip Top, F. E. Wager.
*Tombstone, S. C. Bagg.
Tucson, Edward L. Wetmore.
Signal, Wm. Koshland.
Strawberry, L. P. Nash.
*Volunteer Sp'gs, W. J. Hill.
Walnut Grove, T. B. Carter.
Williams, J. T. Ryan.
Willow Springs, F. A. Chamberlin.
Winslow, C. J. Dillon.

ARKANSAS.
Lead Hill, Silas C. Turnbo.
Little Rock, Arkansas Weather Service.
Winslow, Albert Dunlap.

CALIFORNIA.
American Hill, C. F. Macy.
Anderson, Dr. A. Fouch.
Barstow, Geo. R. Gooding.
Berkeley, Prof. F. Soulé.
Centreville, Wm. Barry.
Colegrove, Seward Cole.
Crescent City, D. S. Shotwell.
Evergreen, S. Holland.
Georgetown, C. M. Fitzgerald.
Grass Valley, B. F. Berriman.
Hydesville, E. T. Foss.
Iowa Hill, L. T. Dwight.
Jolon, T. T. Tidball.
Julian, L. N. Bailey.
La Grange, Jos. Dominica.
*Lewis Creek, John Tuohy.
*Los Banos, A. Widmann.
Mount Hamilton, Lick Observatory.
National City, J. E. Boal.
Needles, Chas. O. Johnson.
Oakland, Dr. J. B. Trembley.
Oroville, Hiram Arents.
*Palmdale, Welwood Murray.
Sacramento, S. H. Gerrish.
Salinas, Dr. E. K. Abbott.
San Bernardino, A. K. Holt.
*San Luis Obispo, J. E. Lewis.
Santa Barbara, H. D. Vail.
Santa Clara, A. Block.
Santa Maria, L. E. Blochman.
Susanville, T. B. Sanders.
Vacaville, G. O. Colburn.
Walla Walla Creek, J. Titcomb.
Walnut Creek, A. L. Bancroft.
Wheatland, Wm. Lumbard.
Willow, David Bentley.

COLORADO.
*Bennet, I. S. Putnam.
Colorado Springs, Colo. Weather Service.
Conifer, Capt. Josse E. Glick.
Delta, J. A. Curtis.
*Denver, Rev. Wm. Forstall.
*Fraser, L. D. C. Gaskill.
Fort Collins, Prof. L. G. Carpenter.
*Grand Lake, Jas. Cairns.
Georgetown, W. A. Jayne, M. D.
Greeley, E. Bethel.
Palmer Lake, Thos. Gaddes, M. D.
Rocky Ford, F. Watrous.

CONNECTICUT.
Hartford, W. W. Ellsworth.
New Hartford, Rev. Wm. Goodwin.
Voluntown, Rev. E. Dewhurst.

DAKOTA.
Alexandria, L. C. Taylor.
*Armour, Jno. J. Angus.
Brookings, Prof. Lewis McLouth.
Canton, W. M. Cappett.
*Carrington, H. M. Durbrow.
Clark, W. H. Boals.
Davenport, J. W. Leech.
De Smet, Thos. H. Ruth.
Gallatin, S. J. Pound.
*Garden City, W. C. T. Newell.

Place of observation and observer.

DAKOTA—Continued.
Huron, Dakota Weather Service.
Kimball, A. S. Stuver.
Napoleon, J. H. Hoof.
New England City, E. S. Clough.
Onida, Mrs. M. F. Goddard.
*Parkston, John J. Swartz.
*Redfield, ——
Roscoe, C. H. Spencer.
Spearfish, J. H. Warren.
*Spring Lake, A. Gould.
Steele, F. R. Hill.
Wahpeton, C. I. Croft.
Webster, Arthur Betts.
Wolsey, G. W. Frink.
Woonsocket, L. O. Libbey.

DELAWARE.
Kirkwood, Wm. Carnagy.

DISTRICT OF COLUMBIA.
*Kendall Green, Deaf and Dumb Institute.

FLORIDA.
Altamonte Sp'gs, M. E. Bingham.
Alva, Chas. E. Robins.
Archer, A. F. Wyman.
Fort Meade, A. H. Adams.
Homeland, J. S. Wade.
Kissimmee, E. E. W. Brewster.
Lake City, Dr. J. C. Neal.
Manatee, Mrs. Mary W. Broberg.
Matanzas, Mrs. B. E. Dupont.
Merritt's Island, Rev. J. H. White.
Tallahassee, Rev. Dr. W. H. Carter.
Villa City, J. Emory Round.

GEORGIA.
Andersonville, H. W. Bryant.
Athens, Prof. L. H. Charbonnier.
Diamond, Wm. Kimzey.
Duck, A. L. Gillespie.
Forsyth, Thos. G. Scott.
Gillsville, C. W. Meaders.
Hephzibah, R. L. Rhodes.
Marietta, G. S. Owen.
Milledgeville, S. A Cook.
Point Peter, G. M. Witcher.
*Quitman, J. L. Cutler.
Thomasville, C. S. Boudurant.
Woolley's Ford, A. J. Julian.

IDAHO.
Era, Hervey Brooks.
Kootenai, David McLaughlin.
Lewiston, Robert Schleicher.
Soda Springs, L. C. Eastman.

ILLINOIS.
*Charleston, J. B. Dazey.
Collinsville, Dr. J. L. R. Wadsworth.
Mattoon, Wm. Dozier.
Mount Morris, Wm. Feary.
Oswego, John S. Seely.
Palestine, John E. Templeton.
*Pekin, Rev. J. E. Terborg.
Peoria, Dr. Fred. Brendel.
Philo, H. A. Burr.
Riley, John W. James.
Rockford, T. D. Robertson.
Sandwich, Dr. N. E. Ballou.
South Evanston, Dr. M. D. Ewell.
Springfield, Ill. Weather Service.
Sycamore, Roswell Dow.
Windsor, A. H. Hatch.

INDIANA.
Butlerville, C. F. Hole.
Dana, J. E. Wright.
Huntertown, J. C. Hunter.
Jeffersonville, J. C. Loomis.
*Laconia, Lafe Crozier.
La Fayette, Ind. Weather Service.
La Fayette, Purdue Institute.
Mauzy, Elwood Kirkwood.
New Providence, Prof. E. S. Hallett.
Point Isabel, Jas. F. Hood.
Scalesville, Urias Wilson.
Sunman, Dr. E. B. Vincent.
Vevay, Prof. Chas. Boerner.

INDIAN TERRITORY.
*Caddo Creek, B. Leming, M. D.
*Guthrie, Morris Collar.
*Jimtown, M. M. Yeakly.
Lehigh, F. M. Madden.
Oklahoma, C. F. Sommer.

IOWA.
Amana, Conrad Schadt.
Ames, J. Rush Lincoln.
Bancroft, H. N. Renfrew.
Blakeville, James Rogers.
Cedar Rapids, H. D. Olds.
Clarinda, A. S. VanSandt.
Clinton, Luke Roberts.
Cresco, Gregory Marshall.
*Cromwell, Harry C. Harrison.
*Denmark, G. B. Brackett.
*Des Moines, Adolphus Voegeli.
Des Moines, Iowa Weather Crop Bulletin Service.
*Dunkerton, J. W. Boyle.
Dysart, Jos. Dysart.
Eagle Grove, C. A. Schaffer.
Elkader, J. N. Hamilton.
Fayette, R. Z. Latimer.

Place of observation and observer.

IOWA—Continued.
Fort Madison, Miss. L. A. McCready.
Gillett, H. L. Pierce.
Glenwood, Seth Dean.
Glenwood, A. Schappel.
Grinnell, Prof. S. J. Buck.
Hampton, E. C. Grenelle.
Humboldt, Miss Florence Prouty.
Independence, Emil F. Wülfke.
Iowa City, Prof. A. A. Veblen.
Jefferson, S. M. Taylor.
Logan, Mrs. M. B. Stern.
McGregor, A. F. Hofer.
Manson, W. L. Thompson.
Maquoketa, A. B. Bowers, M. D.
Monticello, H. D. Smith.
Mount Pleasant, Dr. Max E. Witte.
Mt. Vernon, Prof. Alonso Collin.
Muscatine, J. P. Walton.
Osage, G. D. Pattingill.
Oskaloosa, Joseph Boyd.
*Oskaloosa, O. H. Avey.
Sac City, Dr. Caleb Brown.
Vinton, T. F. McCune.
Washington, Wm. A. Cook.
Webster City, C. M. Trumbauer.
Wesley, Wm. Ward.

KANSAS.
Allison, John J. Cass.
Bendena, G. Campbell.
Cawker City, A. G. Alrich.
*Colby, C. E. Bennett.
Cunningham, E. Shaw.
Elk Falls, Dr. A. C. Williams.
Emporia, Prof. T. H. Dinsmore, jr.
Englewood, C. D. Perry.
Fremont, E. Atkin.
Gibson, C. M. Bell.
Globe, Wm. Featherston.
Havensville, L. W. Dennen.
Independence, J. M. Altaffer.
La Harpe, Isaac S. Coe.
Lawrence, Prof. F. H. Snow.
Lebo, C. B. Jennings.
*Leoti, R. A. Ramey.
Macksville, C. E. Poling.
Manhattan, C. P. Blachley.
*Manhattan, F. J. Rogers.
Morse, R. P. Edgington.
*Rago, D. S. Stratten.
*Rome, D. M. Adams.
*Salina, J. H. Gibson.
Santa Fé, Judge A. P. Heminger.
Sedan, J. W. Goodell.
Topeka, Kansas Weather Service.
Tribune, S. B. Jackson.
Wakefield, Wm. P. Cochran.
Wellington, John H. Wolfe.
Yates Center, F. R. Gray.

KENTUCKY.
Ashland, J. M. Ferguson.
*Bernstadt, John de Planta.
Bowling Green, M. H. Crump.
Canton, C. H. Major.
Earlington, J. B. Atkinson.
Falmouth, F. G. Held.
Frankfort, E. C. Went.
Franklin, T. W. MacGill.
Louisville, Ky. Weather Service.
*McHenry, M. G. Duncan.
*Madisonville, T. J. Gill.
Millersburgh, Rev. C. Pope.
Mount Sterling, H. C. McKee.
*Owensborough, Watkins & Carter.
Owenton, J. S. Cox.
Pellville, Oscar Haynes.
Richmond, Prof. O. A. Kennedy.
Shelbyville, H. W. Prissler.
South Fork, A. B. Gilbert.
Springfield, W. U. Ray.

LOUISIANA.
Cameron, Hon. S. P. Henry.
Emilie, Dr. L. D. Chauff. [S. J.
Grand Coteau, Rev. Jos. A. Ruby,
Houma, H. F. Belanger.
Liberty Hill, E. A. Crawford.
Luling, F. M. Rogers.
Marksville, Leon Molenar.
*New Iberia, Mrs. J. A. Gebert.
New Orleans, La. Weather Service.
Point à la Hache F. C. Myers.
Winnfield, J. M. McCain.

MAINE.
Bar Harbor, Joseph Wood.
Cornish, Silas West.
*Gardiner, Henry Richards.
Kent's Hill, W. C. Strong.
Orono, Prof. M. C. Fernald.

MARYLAND.
Barren Creek Springs, Albert E. Acworth.
Cumberland, E. T. Shriver.
Fallston, Prof. G. G. Curtis.
Frederick, McClintock Young.
Gaithersburgh, J. T. De Sellum.
Galena, Henry Parr.
Gambrills, J. E. Moque.
Jewell, Jos. Plummer.

Place of observation and observer.

MARYLAND—Continued.
McDonogh, McDonogh Institute.
Mt. St. Mary's, Mt. St. Mary's College.
*Woodstock, Woodstock College.

MASSACHUSETTS.
Amherst, Miss S. C. Snell.
Amherst, Mass. Agricultural Experimental Station.
Blue Hill, Rev. A. K. Teele.
Blue Hill Observ'y, A. L. Rotch.
Cambridge, Harvard College Observatory.
Chestnut Hill, D. Fitzgerald.
Dudley, Conant Observatory.
Fall River, C. V. S. Remington.
Heath, B. B. Cutler.
Holyoke, J. W. Doran.
Leicester, Arthur Kendrick.
Nahant, Dr. Wm. D. Hodges.
New Bedford, Thos. R. Rodman.
Newburyport, F. V. Pike.
North Billerica, C. H. Kohlrausch.
Provincetown, John R. Smith.
Royalston, Miss Lizzie W. Chase.
Somerset, Elisha Slade.
Taunton, E. U. Jones, M. D.
Westborough, G. S. Newcomb.
*Williamstown, Williams College Observatory.
Worcester, J. B. Hall.

MICHIGAN.
Berrien Springs, F. A. Zerby.
Birmingham, S. Alexander.
Harrisville, Dr. D. W. Mitchell.
Hudson, Major A. H. Boies.
Kalamazoo, W. A. Black.
Lansing, Dr. H. B. Baker.
Lansing, Mich. Weather Service.
Marshall, G. H. Greener, M. D.
Mottville, J. A. Hartzler.
Thornville, John S. Caulkins.
Traverse City, S. E. Wait.
Ypsilanti, J. C. Bemiss.
Ypsilanti, C. S. Woodard.

MINNESOTA.
Le Sueur, L. B. Davis.
Minneapolis, Wm. Cheney.
Northfield, G. H. Alden.
Saint Paul, Minnesota Weather Service.

MISSISSIPPI.
*Booneville, A. G. Smith.
Fayette (near), I. N. Bedford.
Kosciusko, L. Heyman.
Logtown, C. D. Koch.
Louisville, B. T. Webster.
*Macon, A. T. Dent.
Pontotoc, C. W. Bolton, M. D.
Summit, J. N. Teunisson.
University, Mississippi Weather Service.
Waynesborough, W. S. Daries.

MISSOURI.
Columbia, Mo. State Board of Agriculture.
Conception, Rev. Fr. Paul.
Excelsior Springs, A. Reinisch.
Fayette, Prof. T. Berry Smith.
Frankford, W. W. Vermillion.
Glasgow, Prof. C. W. Pritchett.
Grand Pass, E. R. Graham.
Harrisonville, A. J. Sharpe.
Hermann, Chas. Maushund.
Kansas City, S. J. Spurgeon.
La Monte, J. S. Slaven.
New Frankford, G. W. Hawkins.
New Haven, Max Eimbeck.
Oak Ridge, Henry Bruihl.
Ozark, J. J. Brown.
Princeton, Dr. Wm. Hirons.
St. Charles, Dr. J. R. Mudd.
Savannah, R. Van Buskirk.
Sedalia, C. G. Taylor.
Shelbina, J. S. Chandler.
Steelville, E. A. Pinnell.
Willow Springs, Capt. Wm. Hugh.
Withers Mill, J. R. Dudley.

MONTANA.
Glendive, J. H. Ray.
Fort Logan, Wm. Gaddis.
Powder River, J. M. Graham.
Sheldon, Sarah E. Sheldon.
Virginia City, Eugene Stark.

NEBRASKA.
Ansley, P. Fowlie.
Bingham, W. C. Wood.
*Brownsville, G. D. Carrington.
Creighton, George Roberts.
Crete, Nebraska Weather Service.
Crete, G. F. Gilbert.
*Culbertson, Mrs. Lizzie A. Wibley
*David City, E. B. Taylor.
De Soto, Chas. Seltz.
Fairbury, Dr. I. Humphrey.
Falls City, A. B. Newkirk.
Fremont, Isaac E. Heaton.
Genoa, George S. Truman.
Gering, Jno. P. Finley.
Holmesville, H. E. Sillik.
Hay Springs, Wm. Waterman.

Place of observation and observer.

NEBRASKA—Continued.
Kennedy, Mrs. M. G. Ericson.
Kimball, D. Henderson, Jr.
Marquette, John Ellis.
*Mullen, F. L. Mary.
North Loup, E. W. Black.
*Stratton, J. B. Slime.
Syracuse, P. W. Risser.
Tecumseh, W. L. Dunlap.
Weeping Water, G. Treat.

NEVADA.
Carson City, Chas W. Friend.
Carson City, Nevada Weather Service.

NEW HAMPSHIRE.
Antrim, Frank W. Palmer.
Berlin Mills, Q. A. Bridges.
Concord, W. L. Foster.
Nashua, Chas. H. Webster.
North Sutton, C. E. Hosmer.
Shaker Village, N. A. Briggs.
Belmont, Bristol, Lake Village, Weir's Bridge, Wolfeborough, Lake Winipiseogee Cotton and Woollen Manufacturing Co.

NEW JERSEY.
Beverly, C. F. Richardson.
Egg Harbor City, H. Y. Postma.
*Jersey City, Wright Babcock.
Moorestown, Thos. J. Beans.
New Brunswick, N. J. Weather Service.
Readington, John Fleming.
South Orange, Dr. W. J. Chandler.
Woodbury, W. T. Wilson.

NEW MEXICO.
Albuquerque, S. M. Rowe.
Coolidge, B. S. Mullin.
Gallinas Spring, J. E. Whitmore.
Hillsborough, J. E. Smith.
Las Vegas, F. W. Chatfield.
*Los Lunas, Richard Pohl.
Nogal, José M. Vega.
Red Canyon (Carthage), R. H. Hills

NEW YORK.
Alfred Centre, F. S. Place.
Angelica, J. P. Slocum.
*Arcade, Homer W. Clough.
Ardenia, Richard B. Arden.
Auburn, Geo. Casey.
Boyd's Corners, Thos. Manning.
Canton, Prof. Henry Priest.
Constableville, R. Sanford Miller.
Cooperstown, G. Pomeroy Keese.
Eden, W. P. Hunt.
Elmira, Gerity Brothers.
Factoryville, T. P. Yates.
Fleming, Robt. Warwick.
*Friendship, Jesse D. Rogers.
Geneva, Mrs. N. S. Yates.
Hess Road Station, C. H. Spaulding.
Honeymead Brook (Stanfordville), James Hyatt.
Humphrey, Chas. E. Whitney.
Ilion, G. A. Trowbridge.
Ithaca, Cornell University.
Ithaca, N. Y. Weather Service.
*Kingston, H. A. Stone.
*Le Roy, Prof. F. M. Comstock.
Lowville, W. Hudson Stephens.
Lyons, Dr. M. A. Veeder.
Middleburgh, F. X. Straub.
Newfane Station, F. B. Clark.
New York City, Central Park Observatory.
Nineveh, W. J. Barnett.
North Hammond, C. A. Wooster.
Number Four, Chas. Fenton.
Palermo, E. B. Bartlett.
Palmyra, L. D. Cummings.
Pendleton, W. D. Lovell.
Perry City (near), W. H. Jeffers.
Potsdam, Peter Vilas; G. W. F. Smith.
Queensbury, De Witt C. Jenkins.
Rome, Dr. H. C. Sutton.
Saranac Lake, Jas. P. Mills.
Savona, M. S. Collier, M. D.
Setauket, Selah B. Strong.
*Somerset, J. W. Thurber.
South Canisteo, J. E. Wilson.
South Kortright, D. C. Sharpe.
Tannersville, H. M. Wilson, Jr., M. D.
Turin, R. T. Church.
Utica, Thomas Birt.
Wedgewood, O. F. Corwin.
White Plains, Prof. O. R. Willis.

NORTH CAROLINA.
Asheville, Dr. Karl von Ruck.
Grover, F. H. Dover.
Lenoir, Dr. R. L. Beall.
Mount Pleasant, H. L. T. Ludwig.
Raleigh, Thos. C. Harris.
Raleigh, North Carolina Weather Service.
Soapstone Mount, H. L. Kimrey.
Weldon, T. A. Clark.

List of voluntary stations of the Signal Service, with their respective observers, who furnish meteorological reports for Monthly Weather Review—Cont'd.

Place of observation and observer.	Place of observation and observer.	Place of observation and observer.	Place of observation and observer.	Place of observation and observer.
OHIO.	PENNSYLVANIA—Continued.	TEXAS—Continued.	WISCONSIN—Con.	NEW STATIONS—Con.
*Beallsville, Prof. D. McVay.	Philipsburgh, G. F. Dunkle.	Navasota, C. E. Hull.	Grantsburgh, M. L. Roby, M. D.	Carson, Iowa, G. N. Ferguson.
Bellevue, Wm. Sheffield.	Pleasant Mount, J. D. Brennan.	New Braunfels, Paul Wipprecht.	Greenwood, H. J. Thomas.	Belle Plaine, Iowa, H. W. Vandyke.
Carrollton, P. M. Herold.	Quakertown, J. L. Heacock.	New Ulm, C. Runge.	Hayward, J. M. Custard.	Carroll, Iowa, Moses Simon.
Cleveland, G. A. Hyde.	*Reading, C. M. Dechant.	Pecos City, C. H. Merriman.	Lincoln, A. J. Loose.	Estherville, Iowa, J. H. Barnhart.
College Hill, John W. Hammitt.	Salem Corners, T. B. Orchard, M.D.	*Roby, Crane & Keifer.	Madison, Washburn Observatory.	Murray, Ky., J. P. Jones.
Collinwood, Wm. Smeed.	State College, Agricultural Experimental Station.	Silver Falls, C. M. Tilford.	Manitowoc, Miss Clasina Laps.	Montevideo, Minn., L. G. Moyer.
Columbus, Ohio Weather Service.	*Tipton, Miss C. J. Wilson.	Snyder, A. C. Wilmeth.	Neillsville, W. Henslett.	Carthage, Mo., D. R. Goucher, M.D.
Demos, B. B. Ault.	Troy, Rev. M. Gustin.	UTAH.	*Oshkosh, Prof. W. N. Mumper.	Ironton, Mo., W. H. Delano.
*Elyria, C. W. Goodspeed.	Tuscarora, R. J. Mickey.	Beaver, Rev. J. D. Gillilan.	Richland Centre, Dr. H. M. Ludwig	*Chesterfield, N. H., A. E. Pierce.
Garretteville, S. M. Luther.	Wellsborough, Hiram D. Deming.	Levan, A. B. Larsen.	Summit Lake, E. S. Koepenick.	Turin, N. Y., R. T. Church.
*Glasgow, W. McBane.	West Chester, Dr. Jesse C. Green.	Losee, Ephraim Caffall.	Viroqua, F. J. Bold.	Highland, N. C., Dr. T. G. Harbison.
Jacksonborough, Dr. J. B. Owsley.	RHODE ISLAND.	Mount Carmel, Robert Moncur.	*Waucousta, G. H. Yapp.	Bement, Ohio, P. W. Burton.
Kent, P. W. Eigner.	Kingston, C. O. Flagg.	Mount Pleasant, Hans C. Davidson.	Wausau, Hinemann Bros.	College Station, Tex., Prof. Dugan Adriance.
Kenton, L. J. Demarest.	SOUTH CAROLINA.	Nephi, W. R. May.	Weston, R. R. Wilkinson.	Waco, Tex., W. H. Cameron.
Leipsic, J. D. Hadermann.	*Aiken, Dr. W. H. Geddings.	Saint George, Seth A. Pymm.	WYOMING.	Round Rock, Tex., W. Weiss.
Lordstown, W. S. Dean.	Cedar Springs, J. F. Bayerly.	VERMONT.	Lusk, F. S. Lusk.	Panhandle, Tex., Jas. L. Gray.
Napoleon, Dr. T. C. Hunter.	Columbia, S. C. Weather Service.	Brattleborough, W. H. Childs.	Wheatland, M. R. Johnston.	Dallas, Tex., M. E. Glass.
New Athens, Jos. Holmes.	Kirkwood, Colin Macrae.	Burlington, W. B. Gates.	FOREIGN.	Richfield, Utah, Niels Anderson.
North Lewisburgh, H. D. Gowey.	Port Royal, H. D. Elliott.	*Coventry, W. H. Tibbetts.	*Burnside, S. A., Dr. C. J. Hering.	Moab, Utah, H. J. Crouse.
Orangeville, E. N. Hyde.	Statesburgh, Dr. W. W. Anderson.	East Berkshire, H. B. Lovering.	Grand Turk, West Indies, Geo. I. Gibbs.	Alta, Bingham, Ogden, Park City, Provo, Stockton, Bell Telephone Co., Salt Lake, Utah.
Portsmouth, Dr. D. B. Cotton.	*Simpsonville, Miss N. L. Dawson.	Lunenburgh, Dr. Hiram A. Cutting	Guanajuato, Mexico, Meteorological Observatory.	
Poland, Chas. Stewart.	TENNESSEE.	Manchester, Rev. E. P. Wild.	Hamilton, Bermuda, Gen. Russell Hastings.	
Shanesville, John Roth.	Ashwood, Rev. C. F. Williams.	*Newport, M. B. Trasher.	Havanna, Cuba, Dr. Enrique del Monte.	
Shiloh, Peter Bowman.	Austin, P. B. Calhoun.	Saint Johnsbury, F. Fairbanks.	Killianoo, Alaska, Jos. Zuboff.	
Tiffin, Rev. T. H. Sonedecker.	*Cumberland Gap, A. A. Arthur.	Strafford, H. F. J. Scribner.	La Logia, Mexico, H. Patrick.	
Vienna, W. D. McCorkle.	Milan, Dr. M. D. L. Jordan.	VIRGINIA.	Leon, Mexico, Prof. M. Leal.	
Wauseon, Thos. Mikesell.	Nashville, State Board of Health.	Bolar, G. F. Eakle.	Masatlan, Mexico, Leon P. Acosta	
Westerville, Prof. John Haywood.	Riddleton, P. K. Fergusson.	Birdsnest, C. R. Moore.	Mexico, Mexico, Meteorological Observatory.	
West Milton, Lake S. Motte.	TEXAS.	Christiansburgh, H. D. Walters.	*Monterey, Mexico, Dr. Wm. De Ryee.	
Yellow Sp'gs, Miss Elisa G. Rice.	Austin, Oscar Samostz.	Dale Enterprise, L. J. Heatwole.	Montreal, Quebec, C. H. McLeod.	
OREGON.	Austin, Q. C. Smith, M. D.	Lexington, Prof. H. D. Campbell.	New Westminster, B. C., Capt. A. Peele.	
Albany, John Briggs.	*Baird, D. Richardson.	Mossingford, R. V. Gaines.	Port au Prince, Hayti, Prof. I. Scherer.	
Bandon, Geo. Bennett.	Bear Creek Ranche, W. H. Potter.	Petersburgh, Jas. M. Colson, Jr.	Pueblo, Mexico, Catholic Institute.	
East Portland, Dr. Geo. Wigg.	Belton, E. A. Sterling.	Smithfield, J. R. Purdie.	Topolobampo, Mexico, Capt. Jno. Bell.	
Zola, Thos. Pearce.	Brasoria, H. Stevens.	Spottsville, B. W. Jones.	*Zacatecas, Mexico, Jose A. y Borilla.	
Grant's Pass, Jno. G. Jessup.	*Brenham, J. G. Sloan.	Summit, J. R. Sim.		
Heppner, Arthur Smith.	Brownwood, J. F. Mayo.	University of Virginia, James Wearmouth.		
*La Grande, J. K. Romig.	*Cedar Hill, J. P. Berry.	Wytheville, Howard Shriver.		
Mt. Angel, Rev. F. Barnabas Held.	Cleburne, P. J. Norwood.	WASHINGTON TERRITORY.		
Portland, Oreg. Weather Service.	Coldwater, J. W. O'Brien.	Blakely, R. M. Hoskinson.		
Tillamook, A. P. Wilson.	Colorado, Fred R. Blount.	Vashon, Mrs. C. B. Carpenter.		
PENNSYLVANIA.	Columbia, J. S. Rogers.	WEST VIRGINIA.		
Altoona, Chas. B. Dudley, M. D.	Corsicana, E. L. Gibson.	Clarksburgh, R. T. Lowndes.		
Aqueduct, D. M. Sheeley.	Corsicana, W. H. Hamilton.	Ella, Henry Resseger.		
Blooming Grove, John Grathwohl.	Decatur, H. D. Donald.	*Eglon, Julius Scherr.		
Blue Knob, A. H. Boyle.	*Duval, J. C. Edgar.	Kingwood, J. E. Murdock.		
Catawissa, Robt. M. Graham.	Forestburgh, J. N. Morris.	Pleasant Hill, D. Titchenell.		
Corry, Wm. Loveland.	Fort Worth, Jas. G. Mallett.	Rockport, R. D. J. Echols.		
*Drifton, H. D. Miller.	Fredericksburgh, Arthur Striegler.	Seven Pines, J. R. Sharer.		
Dyberry, Theo. Day.	Gainesville, D. F. Ragsdale.	*Rivesville, J. T. Parsons and F. F. Prickett.		
Easton, Dr. J. W. Moore.	Gallinas, Lum Woodruff.	Rowlesburgh, M. J. Coniff.		
Edinborough, C. F. Sweet.	Galveston, Tex. Weather Service.	Tannery, G. H. Trembly.		
Franklin, Joseph Bell.	Graham, A. B. Gant.	Tyler Creek, F. M. Swann.		
Germantown, Thos. Meehan.	Granbury, E. H. Snider.	WISCONSIN.		
Grampian Hills, Nathan Moore.	Hartley, E. L. McDonaugh.	Cadis, B. C. Curtis.		
Haverford, H. V. Gummere.	Howe, W. M. Smith.	*Delavan, George L. Collie.		
Le Roy, Geo. W. T. Warburton.	La Grange, Jos. Cottam.	Embarrass, J. E. Breed.		
Meadville, David Logan.	Lampasas, Dr. C. M. Ramsdell.	Fond du Lac, J. C. Wedge.		
Meshoppen, Stephen S. Jenkins.	Merkel, J. L. Vaughan.	Friendship, J. M. Harrison.		
Nisbet, J. S. Gibson.	Mesquite, Silas G. Lackey.	*Glasgow, Henry M. Crombie.		
Petersburgh, J. E. Rooney.	Menardville, Louis Runge.			
Philadelphia, Pennsylvania Weather Service.				

New Stations, August, 1889.

Prescott Junction, Ariz., E. McCammon.
Bisbee, Ariz., Rev. J. A. Pritchard.
Buckeye, Ariz., W. E. Hurley.
Pike's Peak, Colo., H. G. Kneeland
*Kremling, Colo., T. H. McDonald
*Oneida, Ill., T. A. Wetmore.
Healdton, Ind. Ter., W. F. McKnight.
McCausland, Iowa, Miss Ruby P. Barr.
West Bend, Iowa, P. Dorweiler.

New Stations, Sept., 1889.

Ash Creek, Ariz., J. H. Hudson.
Dos Cabezas, Ariz., T. C. Bain.
Whetstone, Mt., Ariz., J. D. Kisnear.
Dragon, Ariz., J. W. Graham.
Seligman, Ariz., R. O. Le Grande
Phœnix, Ariz., S. H. Campbell.
Campo, Cal., S. E. Gaskill.
Up'r Mattole, Cal., W. H. Roscoe
Shell Beach, La., E. Dechampeu.
Crookston, Minn., John Ross.
Grand Meadow, Minn., C. F. Greening.
Osseo, Minn., Wm. Kreuger.
Sheldon, Minn., L. Curry.
Ripley, Miss., E. N. Hunt.
Warrensburgh, Mo., Geo. L. Osborne.
Alliance, Nebr., J. D. Shurta.
Howe, Nebr., G. D. Carrington.
Schenectady, N. Y., C. Butler.
Beulah, Oregon, T. L. Arnold.
McMinnville, Oregon, Capt. Wyatt Harris.
Sugar Land, Tex., W. P. Martin.
Hartland, Vt., Rev. A. Hasen.
Liberty, Va., W. N. Stone.
Richmond, Va., W. H. Pleasants
Saratoga, Wyo., J. F. Crawford.

Military posts from which meteorological reports were received, through the Surgeon General of the Army, in time to be used in the preparation of the Monthly Weather Review for September, 1889.

ALABAMA.
Mount Vernon Barracks.

ARIZONA.
Apache, Fort.
Bowie, Fort.
Huachuca, Fort.
Lowell, Fort.
McDowell, Fort.
Mojave, Fort.
San Carlos.
Verde, Fort.
Whipple Barracks.

ARKANSAS.
Hot Springs.
Little Rock Barracks.

CALIFORNIA.
Alcatras Island.
Angel Island.
Benicia Barracks.
Bidwell, Fort.
Gaston, Fort.
Mason, Fort.
*Presidio, San Franc'sco.
San Diego Barracks.

COLORADO.
Crawford, Fort.
Lewis, Fort.
Logan, Fort.
Lyons, Fort.

CONNECTICUT.
Trumbull, Fort.

DAKOTA.
A. Lincoln, Fort.
Bennett, Fort.
Buford, Fort.
Meade, Fort.
Pembina, Fort.
Randall, Fort.
Sully, Fort.
Totten, Fort.
Yates, Fort.

DISTRICT OF COLUMBIA.
Washington Barracks.

FLORIDA.
Barrancas, Fort.
Saint Francis Barracks.

IDAHO.
Boisé Barracks.
Sherman, Fort.

ILLINOIS.
Rock Island Arsenal.
Sheridan, Fort.

INDIAN TERRITORY.
Gibson, Fort.
Reno, Fort,
Sill, Fort.
Supply, Fort.

KANSAS.
Hays, Fort.
Leavenworth, Fort.
Leavenworth Prison.
Riley, Fort.

KENTUCKY.
Newport Barracks.

LOUISIANA.
Jackson Barracks.

MAINE.
Kennebec Arsenal.
Preble, Fort.

MARYLAND.
McHenry, Fort.

MASSACHUSETTS.
Springfield Armory.
Warren, Fort.

MICHIGAN.
Brady, Fort.
Mackinac, Fort.
Wayne, Fort.

MINNESOTA.
Snelling, Fort.

MISSOURI.
Jefferson Barracks.

MONTANA.
Assinniboine, Fort.
Custer, Fort.
Keogh, Fort.
Maginnis, Fort.
Missoula, Fort.
Poplar River, Fort.
Shaw, Fort.

NEBRASKA.
Niobrara, Fort.

NEBRASKA—Cont'd.
Omaha, Fort.
Robinson, Fort.
Sidney, Fort.

NEW MEXICO.
Bayard, Fort.
Marcy, Fort.
Selden, Fort.
Stanton, Fort.
Union, Fort.
*Wingate, Fort.

NEW YORK.
Columbus, Fort.
David's Island.
Hamilton, Fort.
Madison Barracks.
Niagara, Fort.
Plattsburgh Barracks.
Porter, Fort.
Schuyler, Fort.
Wadsworth, Fort.
Watervliet Arsenal.
West Point Mil. Acad'my.

NEW YORK—Cont'd.
Willett's Point.

OHIO.
Columbus Barracks.

OREGON.
Klamath, Fort.

PENNSYLVANIA.
Allegheny Arsenal.
Frankford Arsenal.

RHODE ISLAND.
Adams, Fort.

TEXAS.
Bliss, Fort.
Brown, Fort.
Clark, Fort.
Davis, Fort.
Eagle Pass, Camp.
Elliott, Fort.
Hancock, Fort.
McIntosh, Fort.
Peña Colorado, Camp.

TEXAS—Cont'd.
Ringgold, Fort.
San Antonio, Post at.

UTAH.
Du Chesne, Fort.
Douglas, Fort.

VIRGINIA.
Monroe, Fort.
Myer, Fort.

WASHINGTON TER.
Canby, Fort.
Spokane, Fort.
Townsend, Fort.
Vancouver, Fort.
Walla Walla, Fort.

WYOMING.
Bridger, Fort.
D. A. Russell, Fort.
Laramie, Fort.
*McKinney, Fort.
Pilot Butte, Camp.
Sheridan, Camp.
Washakie, Fort.